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A Viral World: Can We Respond?

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Raisina Files 2021

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EDITORS' NOTE

In the fifth edition of the Raisina Files publication, we aim to engage with the leitmotifs of this past pandemic year, mirroring the theme of the Raisina Dialogue 2021, "#ViralWorld: Outbreaks, Outliers and Out of Control". We have identified five pillars and areas of discussion within this overarching theme to engage with critically—*WHOse Multilateralism? Reconstructing the UN and Beyond*; *Securing and Diversifying Supply Chains*; *Global 'Public Bads': Holding Actors and Nations to Account*; *Infodemic: Navigating a 'No-Truth' World in the Age of Big Brother*; and *The Green Stimulus: Investing in Gender, Growth and Development*. Together, these five pillars of the Raisina Dialogue capture the multitude of conversations and anxieties countries engage and grapple with.

Even as the novel coronavirus continues to loom large over our lives, dictating how each of us live, work and interact, the future of the world order needs to be addressed and requires much scrutiny. In fact, in an already shaky global order, the COVID-19 pandemic shattered whatever little authority multilateral institutions like the World Health Organization had left. In our moment of collective crisis, these institutions failed to protect us. While taking a closer look at the topic of '*WHOse Multilateralism*' in her essay ('Emerging Narratives and the Future of Multilateralism'), Amrita Narlikar says, "Get the narrative on multilateralism right, and we have the possibility to harness international cooperation for global peace and prosperity; get it wrong, and we risk disengagement, fragmentation, decline in welfare across countries, conflict and war," proclaiming that the troubles of multilateralism are far from over.

As multilateralism and the international liberal order frayed at the seams, certain players took advantage of the mounting crisis. The pillar "*Global 'Public Bads': Holding Actors and Nations to Account*" brings our focus to China, the emerging global power, which is no longer a sleeping dragon and whose rise threatens to undermine the legitimacy of the rules-based international order. The implications of China's rise do not stop here. The Middle Kingdom's influence is not limited to multilateral institutions but is deeply rooted in its centrality to global supply chains. "The combined storms of trade wars and pandemics have led to a paradigm shift in the narratives around the global supply chain," says Trisha Ray in her essay, 'Trust but Verify: A Narrative Analysis of "Trusted" Tech Supply Chains'.

In a related vein, Rajeswari Pillai Rajagopalan attempts to understand how the changing global order and the rise of revisionist powers have also brought an acceleration in nuclear proliferation. Her paper, 'Nuclear Insecurity: How Can We Tame the Proliferators?' talks about the "growing danger that proliferation could accelerate." She postulates that "we are potentially entering a new decade of uncertainty and insecurity arising from a failing consensus on nuclear non-proliferation".

Against the backdrop of COVID-19, instead of humankind standing united in the face of a common evil, the race for vaccines has laid bare the stark division and inequality that runs across the world. In 'Can the World Collaborate Amid Vaccine Nationalism?', Shamika Ravi states that, "The main threat to global cooperation on vaccination is the growing vaccine nationalism across major manufacturing nations. The COVID-19 pandemic has mutated into a global political economy crisis, with new fault lines emerging along market shares and intellectual property regimes." This is where Melissa Conley Tyler problematises the age-old international relations tool of diplomacy. In 'Diplomacy in a Divided World,' she investigates why diplomacy lacks advocates in the present day and why the return of diplomacy is worth exploring in the hope that "with greater support, it can do more to bridge what divides us."

The pandemic has not only unsettled an already flailing international system and disrupted supply chains, it has also compressed timelines for the adoption of technology. Along with the benefits that came from it—allowing work-from-home setups and remote contact tracing—the rapid proliferation of technology into our lives has unleashed an 'infodemic' that is running parallel to the pandemic. Addressing the theme of '*Infodemic: Navigating a 'No-Truth' World in the Age of Big Brother*,' Kara Frederick's paper, 'The Infodemic: Regulating the New Public Square,' discusses the almost sovereign control and power enjoyed by US Big Tech and how the sanctity of the digital space is compromised by increased meddling by the parent companies in an attempt to moderate their platforms—trading off the basic right of freedom and selectively chipping away at the legs of democratic values in the process.

Lydia Kostopoulos adopts a similar line as she suggests in her essay, 'De Facto Shared Sovereignty and the Rise of Non-State Statecraft: Imperatives for Nation-States,' that the "Fourth Industrial Revolution will create opportunity and equity for all, governments must proactively co-create that future with Big Tech." Amongst other arguments, she presents that this can be achieved through three ways: **"**Financing the smart infrastructure requirements of the future; provide legal and legislative

frameworks to protect against technological violations of human rights; aggressively work with the industry to minimise, mitigate and stop cyberattacks**."**

In 'Digital Biases: The Chimaera of Equality and Access,' Nanjira Sambuli talks about the slew of systemic change required by us to accept the greater role that technology has been accorded in our lives. In tandem with what was said above, she notes that the new complexities brought in by the digital age would require policymaking in all spheres to control the invasion that would not only sharpen existing inequalities but essentially push the capitalist exploitation of big tech into overdrive. Hence, "Shaping global governance for the digital age cannot afford to ignore these chimaeras."

The pandemic, however, has given us the unique opportunity to 'reset'. Going back to 'business-as-usual will be akin to squandering this once-in-a-lifetime moment. We must 'build back better' for the future with policies that are gender-first and environmentally sound. Understanding the close interconnectedness of smart cities and green cities, Geraldine Ang addresses the lack of large scale green financing in her essay, 'How Finance Can Deliver Real Environmental and Climate Impact'. Taking up the theme '*The Green Stimulus: Investing in Gender, Growth and Development*,' she points out that despite the economic downturn due to COVID-19, investing now in a post-COVID world where we aim to "build back better" is imperative. According to her, the broadest definition of sustainable finance is "a financial system that is stable and tackles long term education, economic, social, environment issues". The next few years will be critical to ensure the financial system is fit for purpose to deliver the financing needed to achieve environmental and other SDGs."

Kanika Chawla further drives this point home in 'Unlocking Capital for Climate Response in The Emerging World'. She calls for an acknowledgement of the urgent need to shift gears to enable the flow of investments required to meet the targets of Sustainable Development Goal 7—ensure access to affordable, reliable, sustainable and modern energy for all. She acknowledges that several obstacles are stacked in the way of policy change that could mobilise just capital for green investments.

India is uniquely placed to emerge first as a US$5 trillion and then as a US$10 trillion economy, which will be green and low carbon in its evolution—the first large green economy of the fourth industrial revolution. But we cannot 'build back better' when half of the population is outside the purview of active policymaking. In their essay, 'Putting Women Front and Centre of India's Green Recovery Process,' Shloka Nath,

Isha Chawla and Shailja Mehta note that India has a tremendous opportunity to guide the global trajectory on climate change by adopting sustainable development practices. They argue, “Local solutions are a starting point for implementation, but scaling them up is essential for such solutions to impact future climate scenarios significantly. Ensuring women’s full and equal participation, focusing on their substantial contribution to climate-compatible development programmes, is imperative to achieving a successful green recovery.”

Further contributing to India’s prospects, Nisha Hollas postulates in ‘Investing in Materials Innovation is Investing in India’s Future’ about the possibility of advancing India’s commitment to sustainable development through more research and development of material science, pushing forth advancements in the sectors of clean energy, health and pharmaceuticals, urban infrastructure, potable water and other amenities.

On a final note, we’d like to thank all the authors of this diverse selection of essays for their contributions—all of whom are women who are leading the charge and excelling in their chosen fields. Also, much gratitude is due to Laetitia Bruce Warjri, who, along with the editors, copyedited this journal and helped make each contribution sharper. This particular journal is close to our hearts. We are delighted that these outstanding women scholars have brought their diverse outlook to this compendium, with the shared intention to mould the post-COVID-19 world into a greener, more socially inclusive and accountable one. This compilation is an expression of our determination to find solutions in dark times as these, and to put forth ideas and solutions that illuminate our tomorrow.

Dr. Samir Saran and Preeti Lourdes John

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Emerging Narratives and the Future of Multilateralism

Amrita Narlikar

Read the pronouncements that come out of Brussels, Geneva and New York, and you might well be forgiven for wondering if the last four years were just a bad dream. After years of taking a severe beating not only directly from former US President Donald Trump but also populists in other countries, multilateralism seems to have acquired a fresh lease of life. In a series of executive orders signed immediately after taking up office, US President Joe Biden not only reinstated his country back into the Paris Agreement, but also halted its withdrawal from the World Health Organization (WHO). After months of delay, the World Trade Organization (WTO) finally got its new Director General in Ngozi Okonjo-Iweala; while her appointment had been opposed by the Trump administration, the Biden team contributed to a smooth way out of persistent deadlock. Observing all these developments, the great and the good of the world breathed a collective sigh of relief. This was reflected in German Chancellor Angela Merkel's speech at the Munich Security Conference (MSC) in February this year: "The prospects for multilateralism are much better now than they were two years ago. This has very much to do with the fact that Joe Biden is now the President of the United States of America."[1] In fact, as I argue in this article, the relief may be rather premature; the troubles of multilateralism are far from over.

There are two competing narratives on multilateralism emerging. The divisions on these are evident even in the transatlantic relationship, though the fault-lines do not fall exactly or neatly between Europe and the US. How this contestation plays out—not only in the transatlantic partnership, but also across the different world regions—will be crucial in determining the future of the multilateral order.

My analysis proceeds in three parts. I first provide a brief overview on the importance of narratives, and how they can make a critical difference in shaping multilateralism itself, and also its ownership and implementation by multiple stakeholders. In the second step, I outline two competing narratives: one seeks only minimal reform; the other, albeit still in early stages of development, suggests a route of major restructuring. Both narratives have their respective advantages and limitations. I discuss these and their policy implications in the third section.

Why and How Narratives Matter

Pioneering a new and rapidly developing field of narrative economics, Robert Shiller defines a narrative as "a simple story or easily expressed explanation of events that many people want to bring up in conversation or on news or social media because it can be used to stimulate the concerns or emotions of others, and/ or because it appears to advance self-interest."[2]

"Narratives" are related to several other concepts (including identities, norms, framing), all of which have attracted different levels of attention from diverse academic disciplines. Paul Collier offers a useful way of categorising these, and writes: "Culture is constituted by mental frameworks i.e. beliefs, and social networks. There are three types of beliefs: identities (which "influence preferences"), narratives (which "influence how causal relationships are (mis)understood"), and norms (which "determine self-imposed constraints")."[3]

Narratives matter because they can serve as "major vectors of rapid change in culture, in zeitgeist, and ultimately in economic behavior."[4] Sitting between higher-order questions of worldviews, identities and norms on the one hand, and more tactical issues of framing on the other, narratives are a powerful and pliable tool for policy intervention.[5]

Narratives—true or false—do not materialise out of thin air. Politicians, scholars, policymakers, journalists, "influencers" and concerned citizens serve as instigators of stories that help people make sense of "facts". For "winning" narratives to emerge from such stories, dissemination is important; in the case of international politics, this requires building inter-state coalitions and working in multi-stakeholder networks that engage with multiple layers of society. Moreover, narratives solely on the universal public good are unlikely to win, especially under conditions of economic or other forms of hardship; rather, successful narratives will usually persuade people also at the individual and local levels. Narratives fixated solely on meticulous technical detail—even if rooted in scientific evidence—are unlikely to find resonance beyond the "global elite"; it is only by bringing in different actors, and having some emotional appeal, that they can emerge as winning narratives.

Some examples may be useful to illustrate how narratives can make a difference. Recall, for instance, the attraction of "America First" and "Make American Great

Again", which contributed to Trump's popularity and electoral success. French President Emmanuel Macron's counter-narrative of "let's make our planet great again" was politically correct, but contributed to discontent within his own country, epitomised by the Yellow Vests' protests. The protests should not have come as a surprise: for individuals who would be hit by mitigation measures, the promise of possible gain for future generations (conditional on other countries also doing their parts) offered cold comfort for serious economic hardships that they would have to endure in their own lifetimes. Had Macron's narrative paid attention to not only making the planet great, but also improving the lives of the French electorate, it might have been more successful. Or, illustrating the limitations of factual (and somewhat stodgy) narratives, recall the Brexit referendum. Even though the economic case to remain in the EU was solid, the "exit" narrative with its passionate commitment to "take back control" turned out to be the more persuasive one.[6]

Get the narrative on multilateralism right, and we have the possibility to harness international cooperation for global peace and prosperity; get it wrong, and we risk disengagement, fragmentation, decline in welfare across countries, conflict and war.

Competing Narratives on Multilateralism

Luckily for all of us, the debate on multilateralism, and how to reform it, is rich and vibrant. But it is deeply polarised.

The polarisation derives in good measure from the stresses that the system has endured, and continues to suffer from. The "China shock" had already thrown sand in the workings of the system, even as member countries of different multilateral organisations struggled to better accommodate the new balance of power; finding the pace of reform too slow, the rising powers sometimes attempted to create parallel international institutions. The "Trump shock" exacerbated previous problems; while the US had been signalling that it was no longer willing to act as the world's policeman,[7] the severity of public critique and disengagement from multilateral institutions went much further during the Trump years. Coming from the world's leading power, which had served as a founder and guarantor of the post-war multilateral order, such attacks on the system were especially damaging. The COVID-19 shock has shed a harsh new light on weaknesses that the system had accumulated.[8]

At a human level, response to such acute stress would be a fight-or-flight response; in the debate on multilateralism, this has translated into two divergent narratives. One narrative asks that we resuscitate and reinforce the system; the other pushes for a fundamental restructuring.

Narrative 1: Resuscitate and Reinforce

A narrative of reviving existing multilateral institutions points to the many global problems that the world faces, which even the most powerful states cannot handle on their own. Containing global pandemics and mitigating climate change are tasks that require global cooperation. The world needs more multilateralism, not less.

This narrative is cognizant of the shocks that the system has faced. But the explanation for ineffective handling of these challenges, as per this narrative, lies not in the institutions of multilateralism but in the member-states. It points to Trump's trade wars as an example of abuse of the system by its most powerful member. The holding up of the appointment/ reappointment of the WTO's Appellate Body members by the US is another example. If multilateralism is to function effectively against such misuses of power, then its institutions need to be strengthened.

Tempting though it is to assume that this is a narrative of naïveté (given that it seems to attribute the primary blame for multilateralism's problems to Trump), many variants of it are not. Take the case of arguments on vaccine access; advocates of this narrative point to the urgency of vaccinating populations nationally and globally to make their own electorates safe locally. Putting one's interests first, according to this narrative, is not only morally repugnant but also rationally unviable. Merkel's speech at the MSC used precisely such an argument:

> "... if the virus is not defeated all over the world, then none of us will be safe, no one can truly be kept safe from the virus. We will be confronted with mutations time and again. The equitable and swift distribution of vaccines to everyone in the world is therefore one of our main tasks. During the recent G7 meeting, Germany pledged an additional 1.5 billion euro for the ACT-Accelerator and, in particular, for the COVAX vaccine facility. We've therefore now made pledges to the tune of 2.5 billion dollars for this programme; and we've done so out of conviction."[9]

The universal embrace that this narrative offers is still rooted in the hope that had driven the multilateralist outreach of the post-1989. While its optimism is now more cautious in light of the growing influence of authoritarian states, it continues to advocate cooperation with systemic competitors and rivals. Merkel's MSC speech reflected this: "On the one hand, China is a systemic competitor. On the other, we need China to help resolve global problems, for instance those relating to biodiversity or climate change mitigation." Sabine Weyand, Director General, EU Trade, similarly defended the EU-China Comprehensive Agreement on Investment (CAI) in a similar way: "There is no alternative to engagement and that is what we need to do here."[10]

The strongest support for this narrative is usually found in Eurocrat circles in Brussels, and trade/UN circles in Geneva and New York. Big businesses too point to the attraction of international markets, and emphasise the importance of sustaining and increasing trade and investment flows amidst worldwide concerns of a post-pandemic recovery. Within governments, ministries mandated to deal with trade, finance and development issues tend to have sympathy with this narrative. Epistemically, this narrative draws succour from the writings especially of trade lawyers and economists.

Recommendations resulting from the *resuscitation and reinforce* narrative involve increasing funding for multilateral organizations (such as the WHO) and ensuring smooth trade flows worldwide (by re-energising the WTO). And while seldom shy of referencing values, this narrative uses a narrower frame (for instance, usually linking trade and investment agreements to labour and environmental standards). Overall, even with such references thrown in, the narrative remains a pragmatic one that seeks to avoid rocking the boat in a precarious sea.

Narrative 2: Restructure

The second narrative calls for a fundamental restructuring. Akin to the first narrative, it acknowledges the gravity of global problems that the world faces, and also recognises the importance of collective action in resolving them. But rather than attribute the failures of multilateralism to its member-states, it points to defects of institutional design. More multilateralism in its current form will only exacerbate the problem. This does not mean giving up on multilateralism in principle. But the practices of multilateralism will need to be rebooted, and its institutions will need to be redesigned, before they can be entrusted with more authority.

The failures of multilateralism, as per this narrative, are many and run deep. The sins of omission and commission of the WHO in its handling of the COVID-19 pandemic provide one example of the damage that flawed multilateralism can contribute to.[11] Rampant globalisation, nurtured by the WTO and other international organisations and pursued as a panacea for all problems, has fostered global value chains that lack reliability. Production patterns based on high levels of economic integration have created opportunities for profit, but also allow for the "weaponization of interdependence"[12]. The multilateral order was not built for a system where the very ties of interdependence—which were supposed to bind countries together into prosperity and peace—could be misused by geopolitical rivals.[13] The rules of multilateral engagement need to be rehauled and updated for a world of weaponised interdependence.

Unlike the first narrative, this narrative does not see an opposition between putting one's own country first and multilateral cooperation. If anything, it sees a strong and robust base at home as a necessary condition for the practice of effective and legitimate multilateralism.[14] The Biden administration embodies this balance: for instance, it maintains its first priority remains "ensuring every American is vaccinated"[15] while also committing to Covax.[16] The US narrative (and policy) stand in dramatic contrast to Europe's, which has continued to export vaccines as part of its multilateral efforts, even in the face of severe vaccine shortages and (avoidable) deaths at home.[17]

It is all too easy to dismiss this narrative as a crude pursuit of nothing more than narrow national interests. However, prominent variants of this narrative also entail a strong commitment to values. Values matter if one wants to build reliable supply chains for strategic products, which in turn requires deeper levels of integration with like-minded and trustworthy allies. And values in this narrative, in contrast to the first narrative, are conceptualized in much broader terms such as democracy and liberalism. See, for instance, Biden's speech:

> "Our partnerships have endured and grown through the years because they are rooted in the richness of our shared democratic values. They're not transactional. They're not extractive. They're built on a vision of a future where every voice matters, where the rights of all are protected and the rule of law is upheld."[18]

This attention to national interests, weaponised interdependence and values together makes the second narrative very different from the first. While recognising the importance of technical details, this narrative is deliberately engaged with political questions. Its stronger versions do not assume or require multilateral initiatives with universal memberships, nor does it push for a pick-and-choose transactional plurilateralism. Rather, it calls for alliances and partnerships of the like-minded, based on values that work hand-in-hand with interests.

Variants of this narrative live in political circles in national capitals. The Biden administration has embraced *some* of its traits. Jens Stoltenberg, the Secretary General of the North Atlantic Treaty Organization, has been developing a similar narrative in recent years (e.g. by calling for a more "global approach" for the alliance that works "even more closely with our international partners to defend our values in a more competitive world. Partners near and far - like Finland and Sweden. But also Australia, Japan, New Zealand and South Korea".[19] Within countries in the global north, the *restructuring* narrative finds greater resonance in ministries dealing with foreign affairs and defence. Its supporters include NGOs and activists concerned about human rights violations, freedom of the press, rule of law and so forth. Small and medium-sized businesses, which stand to gain from a tightening of multilateral trade rules that this narrative entails, can also be supportive; they tend to be less vociferous than big business though, which have reason to fight against the short-term costs that restructured value chains would bring for them.

Recommendations stemming from the *restructure* narrative involve a variable geometry approach. Here—sometimes implicit, sometimes explicit—is the idea of (gradual) strategic decoupling. While partially disengaging with competitors and rivals, this narrative requires deeper integration and partnerships with others that are more like-minded.

Advantages, Limitations and Policy Implications

The first narrative of *resuscitate and reinforce* offers stability in times of crisis. Its conciliatory tone is especially tantalising after four years of Trump's onslaught on multilateralism. Its biggest weakness lies in its proclivity to the *status quo*. And although reform for the sake of it is in no one's interests, there are too many players

today who believe themselves to be ill-served by multilateralism. These include countries in the Indo-Pacific affected by China's rise, different regions of the world concerned about new debt traps, companies that are no longer willing to tolerate repeated violations of intellectual property rights, governments that are concerned about the security threats posed by economic and digital interdependence, and individuals who have endured incalculable (sometimes avoidable) personal loss of life and livelihood due to the pandemic. Minor reform of a multilateral system that has sometimes aided and abetted these developments, and been unable to guard against them at other times, will not satisfy these diverse stakeholders. Turning a blind eye to current violations and carrying on with business as usual will likely damage the system further.[20] Pumping in more money to strengthen multilateral institutions that are already facing a crisis of both legitimacy and effectiveness will end up producing an even greater backlash against multilateralism.

The second narrative of *restructuring* overcomes the *status quo* orientation of the first; in addressing the flaws of the system, it takes the bull by the horns. In its hawkish version though, its problem lies in its swing in the opposite direction: major disruption. Sceptics argue that decoupling will produce a new cold war. Deep integration with like-minded parties will not suffice when dealing with problems like climate change and pandemics, which need all hands on deck.[a] *Talk* of grandiose values may work, but walking this walk will be very difficult for most parties (including established democracies like the US and the EU, which have had their own share of problems in recent years).

The spatial dislocation between the two narratives is interesting. The old world of Europe still veers largely towards the first narrative of *resuscitate and reinforce*; somewhat expectedly, this is also the narrative that one hears frequently in international organizations. Under the previous and current US administrations, we have seen some shifts towards the second narrative of *restructuring*.

a A counter to this critique: preventing pandemics and mitigating climate change is in the interest of all states (including China), and so should not be treated as a "concession" in a bargaining game.

From the perspective of the "global south", there is some irony to witness these developments in the US. After all, multiple actors in the regions of Asia, Africa, Middle East, and Latin America, have—sometimes for decades—been arguing that the multilateral system needs a major overhaul in order to become more inclusive, more transparent, more accountable, and better able to accommodate alternative goals (for instance, by balancing the pursuit of trade liberalisation with the goal of food security). This includes countries like Brazil, India, South Africa, and other middle-income developing countries and least developed countries. Doubling the irony is the fact that while the US is calling for a major update of the rules—especially to enable multilateral institutions to cope better with China's rise—China itself is also attempting to restructure the regional and global order. While not many members of the global south would readily embrace the minor tinkering envisaged by the *resuscitate and reinforce* narrative, scepticism towards the Chinese narrative is also rising. Those in the global north aiming to *restructure* multilateralism would be well-served to engage with like-minded state and non-state actors in the global south also seeking change. While the priorities of these diverse players will not align perfectly with the transatlantic partners, there are many potential overlaps and complementarities in values and interests that could contribute to a shared agenda of meaningful reform.

To overcome the polarisation of the debate, the solution may thus lie in using the restructuring narrative as a focal point. Such a version does not demand that all existing multilateral institutions be razed to the ground. But it does ask for a careful reconsideration of the very purpose of multilateralism. This purpose will probably involve a commitment to values such as liberalism, pluralism and democracy. But it cannot be imposed by the EU and the US on others; it requires engagement with other democracies as equal partners in these endeavours (including countries like India, which has its own powerful traditions of liberalism and pluralism that predate European ones).

A restructured multilateralism need not be a closed shop: countries that are willing to abide by its tightened rules would be welcome to join. For those that clearly adhere to fundamentally different values and pose a geopolitical/geoeconomic threat, entry will admittedly be difficult—perhaps even impossible. In such cases, dialogue will continue; to avoid sending mixed signals, however, side-deals involving deep integration, such as the EU-China Comprehensive Agreement on Investment, will not.

A multilateral order built on the *restructure* narrative—even in its moderate version—will likely result in some decline in prosperity. Some decoupling would have to take place, but only step-by-step and in key strategic sectors, in sync with allies. The cost will also be a shattered dream of all humanity working together as one towards shared visions and goals. But these losses may well be compensated by gains in security, and survival of the values that make us who we are.

Endnotes

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Diplomacy in a Divided World

Melissa Conley Tyler

No one doubts that our world is divided. It is divided by access to resources—between the one in 10 people living in extreme poverty[1] and the richest 1 percent who own 44 percent of the world's wealth.[2] It is divided by the degree of individual freedom and liberty enjoyed by those located in countries that are free, partly free or not free.[3] It is divided in health outcomes, now very noticeably between those who have access to vaccines to counter the COVID-19 pandemic and those that do not.[4] Even climate change—something that will affect us all—often divides the world more than it brings us together.

As the key institution of international society, diplomacy should offer techniques for building understanding across divides and taking cooperative action. But we live in a time where diplomacy seems to be out of favour. In many countries, diplomacy is not viewed as the key tool for dealing with international problems.

This paper investigates why diplomacy sometimes has few supporters, and some factors that can undermine it. As a provocation, it asks us to consider whether diplomacy can indeed offer solutions for the problems of our divided world.

A Venerable Institution

Diplomacy is a centuries-old social practice with its own ceremonial and procedural culture passed down through generations.[5] It is particularly tied to the birth of the nation-state and is described by Hans Morgenthau as of "paramount importance" as an element of national power.[6] Hedley Bull viewed it as a key institution of international society,[7] while Martin Wight described it as the "master-institution" of world politics.[8]

But the golden days of diplomacy are long past. Diplomacy has had to evolve quickly in response to fundamental changes, especially in transport and communications technology, meaning that diplomats no longer have the exclusive gatekeeper role they once held in international affairs.

This has led to a significant evolution in the practice of diplomacy.[9] One memorable description is of a transition from "club" to "network" diplomacy—from secretive interactions between a few elite officials to a more multilateral and polylateral character.[10] Twenty-first-century diplomacy has been described as "multifaceted, pluri-directional, volatile and intensive, due to the increased complexity in terms of actors, dialogues subjects, modes of communication, and plurality of objectives."[11] This has required diplomats to become adept at adaptation.[12] Today's interconnected and technology-driven world requires the modern diplomat to engage with a plethora of new international actors and be happier mixing with the population than inside embassy walls.[13]

The changing operating environment means that concerns about the decline of diplomacy are not new. Morgenthau wrote about the decline of diplomacy in 1948 when: "two superpowers, the centers of two gigantic power blocs, have faced each other in inflexible opposition. They could not retreat without giving up what they considered vital to them. They could not advance without risking combat. Persuasion, then, was tantamount to trickery, compromise meant treason." [14]

In response, he offered nine precepts for reviving diplomacy that provide a useful agenda for times when these fundamentals are out of favour.[15] He suggested four fundamental rules—to define foreign policy objectives in terms of the national interest; avoid a crusading spirit; look from the point of view of other nations; and be willing to compromise on non-vital issues—along with five prerequisites for compromise: do not be legalistic; do not put yourself in a position from which you cannot retreat; do not allow a weak ally to make decisions for you; and do not allow either the armed forces or public opinion to control foreign policy.

This is pertinent advice as we live through another period where diplomacy is particularly challenged.

Various factors have led diplomatic approaches to be sidelined in recent years in the US, China and Australia. But in each case, diplomacy can be revived by recalling one of its fundamental precepts.[16]

Diplomacy vs. Populism: Trump's America

The Trump administration's attitude has been described as a "war on peace and the end of diplomacy,"[17] with the damage done to the State Department well-documented. Ronan Farrow lays out the vicious cycle: "American leadership no longer valued diplomats, which led to the kind of cuts that made diplomats less valuable. Rinse, repeat."

Former Secretary of State Rex Tillerson is often particularly blamed for the budget cuts and restructuring[18] that led to what has been described as a "near-dismantling of America's diplomatic corps, chasing out hundreds of State Department employees and scaling back the country's engagement with the world."[19] Even after Tillerson's departure, the diplomatic apparatus never reached full strength; for example, the Trump administration never managed to appoint an ambassador to Singapore.[20]

According to Gordon Flake, head of the Perth USAsia Centre, "President [Donald] Trump viewed diplomats as the enemy, as the deep state."[21] Diplomats are an easy target for scorn as a "self-serving establishment"[22] and "unaccountable elite".[23] As the Lowy Institute's Director of Research Alex Oliver argues, "Diplomacy has always been viewed as a preserve of the elite, hence the stereotype of champagne-sipping diplomats. This is a legacy that is hard to shed. Populism is toxic for the regard that diplomacy is held in. Diplomacy is all too much about compromise and collaboration."[24] She argues that "Under the Trump administration, we saw the sidelining of diplomacy, bureaucracy and other informed decision-makers, which has generated repercussions from partners. It exacerbated a mode of state-to-state relations, which featured centralising of decision-making within leaders' offices with decisions on diplomatic engagement managed by a small cohort of staffers."[25]

Populist leaders are often associated with centralising foreign policy decision-making in the leader and the leader's family. Leaders tend to express suspicion of professional diplomats who are, definitionally, elites. They prefer to conduct leader-on-leader diplomacy.

With Trump, this meant diplomacy via Twitter and via leaders' summits,[26] which he thought showed off his deal-making abilities, plus significant roles for family members. It also meant a reliance on populist solutions—offering deceptively simple answers to complex problems. According to Peter Varghese, former head of Australia's

Department of Foreign Affairs and Trade, "Populism tends to displace knowledge-based policy. Populists have little time for expert explanations about why countries may be taking particular positions. But populism eventually runs out of puff because it can't actually deliver the simple solutions it promises."[27]

Despite Trump's showy initiatives—such as his summitry and border visit to North Korea—he finished his term with little to show by way of results for US national interests, and with long-term damage to institutions of diplomacy.

The US needs to return to Morgenthau's precepts that "the objectives of foreign policy must be defined in terms of the national interest" and "the government is the leader of public opinion, not its slave."[28]

Diplomacy vs. Ideology: China's Wol f Warriors

Another major challenge for diplomacy is domestic politics: specifically, domestic nationalism and the desire to be seen as "tough" on foreigners. An example of this has been China's "wolf warriors"—named after a patriotic movie franchise—who have conducted foreign policy with an eye to domestic audiences wanting to see an assertive China pursuing its national greatness.

These diplomats are known for using social media tools to defend their home country aggressively online.[29] Their behaviour has often been decidedly undiplomatic, with governments in Sweden, Kazakhstan and France summoning China's ambassadors to address concerns about tactless behaviour and, in Sri Lanka, China's embassy being suspended from Twitter due to an offensive tweet.[30]

This new approach by the Chinese foreign ministry is considered a direct response to President Xi Jinping issuing diplomats a memo in 2019 to show more "fighting spirit".[31]

Demanding that one's diplomats be demonstratively patriotic means it is difficult for them to do their job in terms of connecting with their host society. As Griffith Asia Institute Director Caitlin Byrne puts it, diplomats operate in a curious liminal space between domestic constituencies and foreign audiences where an air of duplicity and slipperiness is hard to shake.[32] Her colleague Ian Hall notes that diplomats have to

constantly maintain their legitimacy, managing "the suspicion of their host state and that of their own state, demonstrating to both their honesty, reliability and capacity."[33] This is harder when there is pressure to show fighting spirit.

The turn away from diplomacy has been counterproductive to China's international interests. It has led to tweaks by social media platforms to try to rein in state-linked accounts.[34] More broadly, polling by Pew Research shows China's international reputation in advanced economies has plummeted over the past decade.[35] Worse, it makes life more complicated for counterparts who are otherwise-minded to cooperate with Beijing.[36] China's assertive diplomacy has been spectacularly unsuccessful as a way of winning hearts and minds.

China needs to return to Morgenthau's rules that "diplomacy must be divested of the crusading spirit" and "diplomacy must look at the political scene from the point of view of other nations".[37]

Diplomacy vs. Security: Australia's Wolverines

Diplomacy can also be supplanted by a security mindset where the national security apparatus predominates over other tools. This can be seen in Australia where the percentage of spending on diplomacy and development is now at its lowest ever, having dropped from almost 9 percent of the federal budget in 1949 to only 1.3 percent in 2019.[38] The Department of Foreign Affairs and Trade particularly suffered during the 9/11 decade compared to the ballooning budgets of security and intelligence agencies.

The predominance of military thinking (dubbed 'mil-think' by some) has consequences for foreign policy.[39] Security thinking tends to paint in black and white, as enemies and friends.[40] The focus is on denying the enemy its interests and every concession can be painted as a loss of sovereignty rather than a trade-off. This is appropriate when in conflict. The problem is in peacetime, if it subordinates a less adversarial civilian perspective.

In the Australian context, the issue has become about who runs the relationship with China. Former Ambassador to China Geoff Raby wrote that within "the small, tight Canberra policy circle, in the years since the Abbott government had been elected, the security-intelligence-military establishment had come to lead on China policy."[41]

At the political level, this was supported by a group of Australian parliamentarians who self-identify as tough on China and call themselves the "Wolverines", again after a movie.[42]

Insiders believe that Australia has reached a point where the security mindset is dominant, with the intelligence and security agencies reportedly having more influence than during the Cold War.[43] No less a figure than Dennis Richardson—former head of the foreign affairs and trade and defence ministries and the Australian Security Intelligence Organisation—has publicly warned against "national security cowboys" running the show.[44]

This is not driven by public opinion. In the latest Lowy Poll, the top five threats that worry Australians are ones that will not be helped by more military hardware—drought, pandemics, global economic downturn, environmental disasters and climate change.[45]

Arguably there is a gender aspect to this. In places like Australia where women have made inroads in serving their country in international affairs, they are more likely to be serving in diplomacy than in defence. There is a danger that diplomacy thus becomes seen as feminised—as "soft" rather than "hard"—and so is sidelined.[46] Francis Fukuyama put this explicitly, arguing in 1998 that countries would be weakened by the feminisation of international politics: "As women gain power in these countries, the latter should become less aggressive, adventurous, competitive, and violent."[47]

But the privileging of the security view does not play to Australia's strengths. No matter what Australia spends, it is not going to have the largest military in the region.[48] But it is realistic to have the most effective diplomats promoting its interests and to be the most trusted development partner, showing off positive Australian traits like pragmatism and problem-solving.

Australia needs to return to Morgenthau's precept that "the armed forces are the instrument of foreign policy, not its master."[49]

A Widespread Phenomenon

Interestingly, the sidelining of diplomacy appears to be widespread. As Varghese has observed: "In Western developed economies we see the hollowing out of foreign ministries with cuts in resourcing and less dependence on country expertise in the making of foreign policy. Governments do not perceive any big political costs in cutting their budgets."[50]

But the depreciation of diplomacy is not universal and will manifest in different ways in different places. For example, India has historically had a small foreign service compared to its role in the world,[51] so in the last election, the government promised to "increase the strength of the diplomatic and allied cadres to keep pace with our increasing global engagement."[52]

Several countries are increasing their funding for diplomacy. Japan is opening new diplomatic missions,[53] and the Pacific Island nations are using diplomatic tools at the regional and global level to respond to the existential threat of climate change.[54]

Different countries also have varying historical attitudes toward diplomacy. In Brazil, there is a tradition of venerating diplomatic heroes, from a statue in its capital to an institute dedicated to the nation's diplomatic history.[55] This should mean that diplomacy had more cachet to help weather negative forces. Even so, the populist Bolsonaro administration does appear to have significantly affected Brazil's diplomacy,[56] with the president promising to change the "ideological bias" of the foreign ministry.[57]

In each place, factors that undermine diplomacy may impact in different ways.

Idealists Despair

Perhaps one of the most significant issues for the popularity of diplomacy is its incrementalism. It is, at the base, a fundamentally realist profession that deals with the world as it is. Diplomacy requires a degree of acceptance about what is possible, acknowledging hard truths about the international system, like[58]

- The world is not remotely fair
- Most other countries do not share our viewpoint and do not care about our interests
- Aggression and escalation are seductively easy but unlikely to be productive
- International cooperation is a hard slog.

As Varghese puts it, “Diplomacy has to take the world as it is. It can’t pretend to live in a populists’ world – where everything is simple – or in an ideological world. Good diplomacy is always anchored in hard realities.”[59]

Diplomacy means living with compromises, stopgaps and partial solutions. It accepts that friction is unavoidable; the task of diplomacy is to manage, contain and ease the effects of friction.[60] Diplomacy deals with nuance (which can sound like being an apologist) and engagement (which can sound like appeasement). Diplomats have to understand how issues look from other countries’ points of view (which can sound like agreeing with the other side).

Diplomacy is not often revolutionary. This does not fit well in a time that wants rapid change and immediate solutions to problems. In “a post-truth, hyperemotional world”, the “pragmatic nature of traditional diplomacy prevents it from employing a similarly emotional response. In the eyes of socially engaged publics, this delegitimises traditional diplomacy”.[61]

However, diplomacy does have ambition—it works towards making small improvements through grinding, painstaking work. This has been wonderfully described as “dogged low gear idealism”.[62] Maybe that is the best we can hope for in a world where we agree on little.

Countries need to recall the precept, “nations must be willing to compromise on all issues that are not vital to them.”[63]

The Promise of Diplomacy

Looking forward, what are the prospects for diplomacy? What can diplomacy offer?

Under President Joe Biden, the US has announced a turn back to diplomacy. In his presidential campaign, Biden promised to bring back a diplomacy-first approach:

> "As president, Biden will elevate diplomacy as the premier tool of our global engagement. He will rebuild a modern, agile U.S. Department of State—investing in and re-empowering the finest diplomatic corps in the world and leveraging the full talent and richness of America's diversity. Working cooperatively with other nations makes us more secure and more successful."[64]

This was illustrated when Biden decided to give his first foreign policy speech at the State Department, telling his nation's diplomats "the message I want the world to hear today: America is back. America is back. Diplomacy is back at the center of our foreign policy."[65] Observers expect the Biden administration to break with the Trump approach. As Oliver describes it:

> "President Biden will approach diplomacy quite differently. Diplomacy may well back. It might make a return in the West and force a return to more normal diplomacy in G20 nations. Multilateralism will be back as well, with the US re-entering the Paris Accords and World Health Organization. This will also assist in bringing diplomacy back to a more normal mode."[66]

The return of diplomacy is worth encouraging. Varghese argues that diplomacy can contribute to the really big issues, including forging a new strategic equilibrium in the Indo-Pacific, making a case for an open economy and refashioning the institutions of a revamped international order. "To get out of the difficulties that we're currently in, diplomacy has to come to the fore again: to make sense of a period of some considerable uncertainty and to lead the institutional rebuilding we need," he says.[67]

Allan Gyngell, national president of the Australian Institute of International Affairs, believes that multilateralism in its current form has passed its use-by date and that diplomacy is part of the solution: "The model we have – large, centralised, slow-moving bureaucracies with universal membership… – won't take us through to the mid-21st century. We see the problems in organisations ranging from the WTO to the

WHO. But in current circumstances, where can we find the energy and effort needed to respond? The answer will come, as it always must, from the part of statecraft we call foreign policy, and from diplomacy, which is its operating system."[68]

Diplomacy has been with us for a long while. Despite the challenges it faces, it does not seem likely to go away. But with greater support, it can do more to bridge what divides us.

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3

Is a Cold War 2.0 Inevitable?

Velina Tchakarova

The global system[1] has never been as interconnected as was demonstrated by the COVID-19 outbreak. But global affairs are also at an inflection point. An unexpected manifestation of the pandemic is the bifurcation of the global order in a way unseen since the Cold War. It begs the question—is the world witnessing the beginning of a new bipolar era of global competition?

Global powers rise and fall. The pendulum swings back and forth, and a fragile equilibrium is achieved through the constant struggle for power and influence that keeps global affairs afloat. The rationale behind it lies in maximising the gains, forming powerful alliances and partnerships, and building enough capabilities to project power beyond the national realm. Any competitor strong enough to question the dominance of a global power will surely seize an opportunity to fill the gaps wherever they may present themselves. In the presence of a hegemon, there is always a process of polarisation that leads to the creation of a secondary system organised around a pole consisting of a single competitor or a group of rivals that seek to undermine the incumbent's global power supremacy. To put things into perspective: a global reserve currency is not possible nowadays without the global power projection capabilities that enable the US to control the interconnected flows of goods, capital, services, and data, and to protect trade and transport routes from disruptions that might result in major supply shocks.

Global affairs are constantly influenced by competition and cooperation. The global system has recently entered a new transitional period with the formation of two centres of power—the US and China. The former has predominantly shaped international relations since the collapse of the Soviet Union at the end of the Cold War through global power projection via transnational networks established over decades of world dominance. On the other hand, given China's impressive economic growth trajectories, even during the COVID-19 pandemic, there are heightened expectations around its continued rise to prominence in the global arena. However, it remains to be seen whether Beijing will be capable of transforming its growing geoeconomic clout and geopolitical influence into global power projection. Under any circumstance, the global system is already facing profound consequences, with long-lasting impacts for international affairs. Is a Cold War 2.0 inevitable amid the competition between the US and China?

From ‘Chimerica’ to Systemic Decoupling

According to US President Joe Biden’s new administration, China “is the only competitor potentially capable of combining its economic, diplomatic, military, and technological power to mount a sustained challenge to a stable and open international system.”[2] Furthermore, Secretary of State Antony Blinken portrayed China as “America's most powerful adversary and competitor” as well as “America's biggest geopolitical test of the 21st century".[3] Chinese President Xi Jinping similarly identified the US as “the biggest source of chaos in the present-day world” as well as “the biggest threat to our country’s development and security.”[4] Moreover, the Chinese Communist Party “revealed late last year that the [Five Year] plan would span not just military but also economic, financial, and technological security.”[5]

A systemic rivalry means competition over the access to and control of global socioeconomic networks and structures. The integration of China into US-led systems during the Cold War and afterwards led to the emergence of what many have termed as “Chimerica”.[6] Globalisation created highly interconnected networks between Washington and Beijing, while also causing the consequent rise of China. This unintended outcome has led to China challenging US dominance in various spheres. This ongoing phenomenon has a ‘Cold War-like’ texture and may implicate the emergence of what has been termed as systemic decoupling—“the creation of two separate systems, that are often in competition with each other.”[7]

In the 1960s, British geographer Halford Mackinder claimed that China could become a major player in global affairs based on its geographic location, stretching from the “heartland” to “rimland terrains” of the world.[8] In keeping with Mackinder’s vision, China is seeking to establish a terrestrial connectivity through Eurasia[9] with the industrial heart of Europe—Germany, France, Italy, and Great Britain. Central and Eastern Europe are key to win “the heartland” as the control over these geographies will enable China’s global power projection. China’s Belt and Road Initiative (BRI)[10] can be viewed through the Mackinder prism. The BRI entails two terrestrial connectivity routes to Central and Eastern Europe—one through Russia, and the other through Central Asia and Turkey. Additionally, Beijing has also introduced various political and economic platforms for engagement and cooperation, with the ‘Cooperation between China and Central and Eastern European Countries’ (or the ‘17+1’) initiative the most prominent among them.[11] Based on Nicholas Spykman’s geopolitical premises,[12] China is also building up its sea power presence in the ‘rimland terrains’

of the South China Sea and the Indo-Pacific, and has developed a "string of pearls" approach in the Indian Ocean Region (IOR) to create a network of friendly ports and trade posts in India's immediate neighbourhood as part of the maritime connectivity within the BRI.[13]

Political scientist Andrew Michta describes Beijing's endgame as a "global inversion" of the interconnected trade flows, "which currently favour maritime routes, a setup that relies on U.S. naval power as enforcement. If China can develop a cross-Eurasian supply chain and protect it, it won't need to match America in the maritime domain."[14] In reality, China is already pursuing the simultaneous formation of alternative routes via maritime and terrestrial connectivity, an approach combining Mackinder's "heartland" and Spykman's "rimland" strategies. China is seizing the opportunity to become the first Asian global power in modern international relations. However, Beijing's global rise will primarily be determined by the outcome of the Fourth Industrial Revolution and its capability to establish global networks of finance, trade, energy, economics and diplomacy.

Contrary to the bipolar global order established during the Cold War, the systemic rivalry between the US and China is evolving simultaneously at sea and on land. State actors seek to "weaponize interdependence" by leveraging global networks for strategic advantages.[15] There are four domains that will be crucial in determining the outcome of this mutual competition—political economy, technology, international rules and ideology, and partnerships and alliances.

Political Economy

According to realpolitik thinking,[16] the distribution of power lies at the heart of international relations. Realpolitik has once again become the true motor of global affairs; it is the main driver of the systemic decoupling between the US and China following the shift of global power from the Atlantic to the Indo-Pacific. Competition between the two systemic rivals was already taking shape when former US President Barack Obama launched the American pivot to Asia and engaged with likeminded states to build institutional alliances, trade blocs and coalitions to counterbalance China's increasing geoeconomic clout. His successor Donald Trump continued building up the pressure on Beijing on all fronts, mostly by applying a protectionist approach through bilateral agreements and coalitions.[17]

But Washington is not the only one pursuing the decoupling of 'Chimerica'; Beijing is just as keen to break up its dependence on American monetary, financial, economic, trade, diplomatic and technological networks. China is focusing on "sustaining economic growth and prosperity, developing its domestic markets, boosting innovation and technology, improving its military capabilities and maintaining domestic stability."[18] Its approach is clearly aimed at achieving greater self-sufficiency by establishing alternative systems and substituting critical connectedness that is "forcing China and the United States towards a zero-sum understanding" [19] due to the complex challenges and the bifurcation of the global affairs today.

Riding the Fourth Industrial Revolution Wave

The nature of globalisation is determined by the geoeconomic and geopolitical expansion model by the nation-state that has established global dominance, much like Great Britain did in the nineteenth century and the US did at the end of the Cold War in the twentieth century. Both states achieved a dominant position in global affairs by riding the wave of previous industrial revolutions. Which country will emerge the winner from the ongoing digital revolution is yet to be seen, but the victor will surely impose its dominance on competitors and allies alike in the future. Attempts at establishing supremacy during the Fourth Industrial Revolution necessitates a drive towards self-sufficiency in critical technologies and global supply chains. Logically, there can only be one winner in such a contest; Xi has staked early claim and "has publicly proclaimed the imminence of China's industrial superiority and strived to achieve it via the largest industrial espionage offensive in history."[20]

At the same time, reconfiguring global supply chains away from China is becoming a reality as American capital withdrew from Beijing amidst COVID-19.[21] A global disruption of supply chains, alongside an imperilled rules-based global order and eroding international structures, has impacted all regions around the world. But the reconfiguration will be initiated mainly by the US to bring manufacturing and supply chains back home or to trusted partner countries. Moving production from traditional hubs to new ones will take time and effort but will also certainly create new geoeconomic advantages for certain actor such as India, projected to become the world's third-largest economic power in the next decade.[22] Regional centres of trade, such as Japan and the European Union (EU), have already began considering a shift of manufacturing operations out of China. Over the long term, two parallel

supply chains networks are likely to emerge—one centred around the US, the other facilitated by China.[23]

Sectors such as space technologies, artificial intelligence, defence and the cyber domain will witness strategic investments to promote the growth of new, regional power centres. This is important since any significant breakthrough in these areas will bestow global competitiveness and geoeconomic advantages. Further, the unprecedented interconnectedness of all socioeconomic systems has obfuscated any distinction between economic and trade indicators on one hand, and defence and security considerations on the other. This explains why the competition between the US and China does not solely represent a trade war but a broader rivalry extending to the global networks of finance, trade, economy, diplomacy, energy, defence and so forth.

Battle Over Global Norms and Ideologies

The Cold War encompassed a competition over the systemic hierarchy of international values, norms, and rules. After the Soviet Union's collapse, the US was able to define this agenda by promoting the liberal ideas of a democratic political order coupled with a market economy, human rights, and freedoms. Similarly, the outcome of the ongoing competition between Washington and Beijing will also have an impact on the future of the global order in terms of norms, standards, rules, and values.[24] This will be implicated by a growing systemic coordination between China and Russia (the "Dragonbear"[25]) that indicates "a willingness to challenge the international order and the US position in it."[26]

While there is no overt ideological competition yet, the US-led liberal international order is facing a threat from the growing influence of the Chinese Communist Party's authoritarian ideology and governance model.[27] Following China's global ascent, authoritarian regimes and ideas have established a stronghold in Southeast Asia, with "strongmen in power in Myanmar, Thailand and Cambodia, single parties in Laos and Vietnam, and democracy eroding in the Philippines, Malaysia, Indonesia."[28] China has also drawn international attention for human rights abuses, "including a crackdown on pro-democracy activists in Hong Kong and against Uighurs in Xinjiang."[29] And there is some speculation that Beijing might seek to penetrate the political spectrum and socioeconomic fabric of Taiwan to establish control over its processes and structures in the long run.[30]

At the same time, the demand for a COVID-19 vaccine scenario has presented a new dimension to the ongoing battle of international vaccines, and will pose a new challenge for the West as China sought to establish a "Health Silk Road" at the beginning of the pandemic to support partner countries with medical supplies.[31] Furthermore, Beijing aims to enhance its global image through its vaccine diplomacy.[32] In response, the US and three of its closest Indo-Pacific partners—India, Japan and Australia; together known as the Quadrilateral Security Dialogue (Quad)[33]—committed to boosting COVID-19 vaccine supply at their first summit and pledged to cooperate in the maritime, security, and cyber domain to meet the challenges posed by China.[34] Quad cooperation is aimed at boosting security and defence ties between the four Indo-Pacific countries while counterbalancing China's rise in this region.

The United Nations (UN) and other international organisations have already been impacted by the ongoing global power competition between the US and China. The diminished role of the UN Security Council (UNSC) is linked to Washington's declining international role, particularly under the Trump administration.[35] It has been unable to keep the transatlantic community together and often faces difficulties in convincing allies to vote in favour of its draft resolutions (for instance, on Iran[36]). This is compounded by the rising assertiveness of China and Russia as diplomatic powers and their deft manoeuvring of multilateral institutions.

Multilateralism is at risk of becoming only a buzzword,[37] with institutions reduced to playgrounds for diplomatic battles between competing powers, much like the UNSC was during the Cold War. This dynamic could easily resurface, with the transatlantic community on one side, and China and Russia on the other. China and Russia operate within the existent global order with the clear goal of disrupting it, dismantling its multilateral structures, and creating better conditions for their conceptualisation of multilateralism, which is strictly opposed to Western values, norms and rules.[38] Coordinated efforts by the Dragonbear within the UNSC and other international organisations will likely increase further, as both states will seek to boost their international image as norm-setters in a rapidly changing rules-based global order.

Systemic Bipolar Era and Alliances

The emergence of regional power centres has created the illusion of multipolarity, even as the systemic bipolarity between the US and China encompasses all relevant

networks. An important structural layer of the global system consists of middle-sized powers oscillating between Washington and Beijing to maximise their own gains while avoiding picking a side for as long as possible—there are neither eternal allies, nor perpetual enemies, only eternal and perpetual interests.[39] This seems to be the leading geopolitical maxim of the upcoming Indo-Pacific decade. To counterbalance the growing Chinese presence in the IOR and its direct neighbourhood, India is expanding its network of regional and bilateral partnerships through various security and defence constellations, "while playing as well, carefully but with dedication, the card of the Indo-Pacific."[40] Other key players like Canada, Great Britain, France, Germany, Italy, Australia, and Turkey have one thing in common, especially amid the COVID-19 pandemic—playing a balancing act between the US and China while delaying the difficult task of choosing a side. From a geopolitical point of view, the new great game will be predominantly situated in the South China Sea and the Indian Ocean due to rising competition between the two Asian giants, China and India, in addition to the systemic rivalry between China and the US.

The main hotspots and potential triggers for an escalation of the US-China rivalry are in the South and East China Seas, the Indian Ocean, the Mediterranean, the Caspian, and the Black Sea, as well as in the Middle East and North Africa. Tensions are also expected along the global chokepoints for energy and food as well as the Chinese Belt and Road connectivity. China has been in the lead at various multilateral forums, such as BRICS, the Asian Investment and Infrastructure Bank and the Shanghai Cooperation Organisation, and trade blocs such as the Regional Comprehensive Economic Partnership, which covers 15 countries in the Asia-Pacific region but excludes major economic powers like the US, EU and India.[41] The chasm between Washington and Beijing has not only led to the bipolarisation of the global order but has also increasingly put pressure on the regional powers caught in the middle.

What Next

China has become the main external factor in American domestic politics, but the US can only exert a limited influence on Chinese domestic affairs. International cooperation has become a function of the competition and systemic rivalry between Washington and Beijing. But this competition need not necessarily turn into an overt and direct confrontation. Blinken stressed that the "relationship with China will be competitive when it should be, collaborative when it can be, and adversarial when

it must be."[42] During the first face-to-face high-level bilateral talks with the Biden administration, China's top diplomat Yang Jiechi stressed that "US can no longer 'speak to China from a position of strength'".[43]

The competition between the US and China is made up as much by the technological, geoeconomic and institutional decoupling as it is by the oscillating alliances of middle power countries. China has already become a second pole of global power and has also begun challenging existing international structures and networks. While the US is seeking to preserve its institutional heritage, technological leverage and geoeconomic clout in cooperation with transatlantic allies and regional partners, China will clearly aim to establish and promote alternative structures and systems to counterbalance and challenge the American dominance. These competing strategies cannot result in a win-win situation. Eventually, the systemic competition between the US and China will fragment the interdependent and globalised world by unleashing centrifugal forces of bipolarity, affecting the entire Global system deeply.

A pessimistic scenario will mean a more radical and consistent mutual decoupling, while an optimistic view reveals a more peaceful systemic coexistence, with Beijing focusing on partnerships and commitments to strengthen its domestic development until it builds a counterbalance to the overwhelming American influence.[44] In both scenarios, the message is clear—every state actor, big or small, will have to choose sides between two very different global offerings, each with their own set of norms, rules and ideologies.[45] The US has so far been the biggest source of China's wealth.[46] And yet, Washington might also become the biggest source of China's demise. The US will certainly not shy away from advancing this idea under aggravating circumstances of global power competition.

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4

Trust but Verify: A Narrative Analysis of "Trusted" Tech Supply Chains

Trisha Ray

Supply chains for critical and emerging technologies face mounting scrutiny in the wake of two related disruptions—one precipitated by the COVID-19 pandemic and the other by tensions between the world's two largest economies, China and the US. Decades of efficiency-driven shifts that gave rise to the global supply chain have also made them fragile and riddled with bottlenecks. At the same time, the need to verify the "trustworthiness" of suppliers has created an added layer of scrutiny.

However, what does the concept of "trusted supply chains" mean in this evolving context? Depending on the "who" and "where" attached to this question, "trusted" can variously mean secure, transparent, adaptive, ethical or stable.

This brief will identify characteristics of global supply chains for critical technologies, highlight the various ways different actors define "trusted supply chains" and then present some core characteristics of this emerging narrative.

The Meteoric Rise of Global Supply Chains

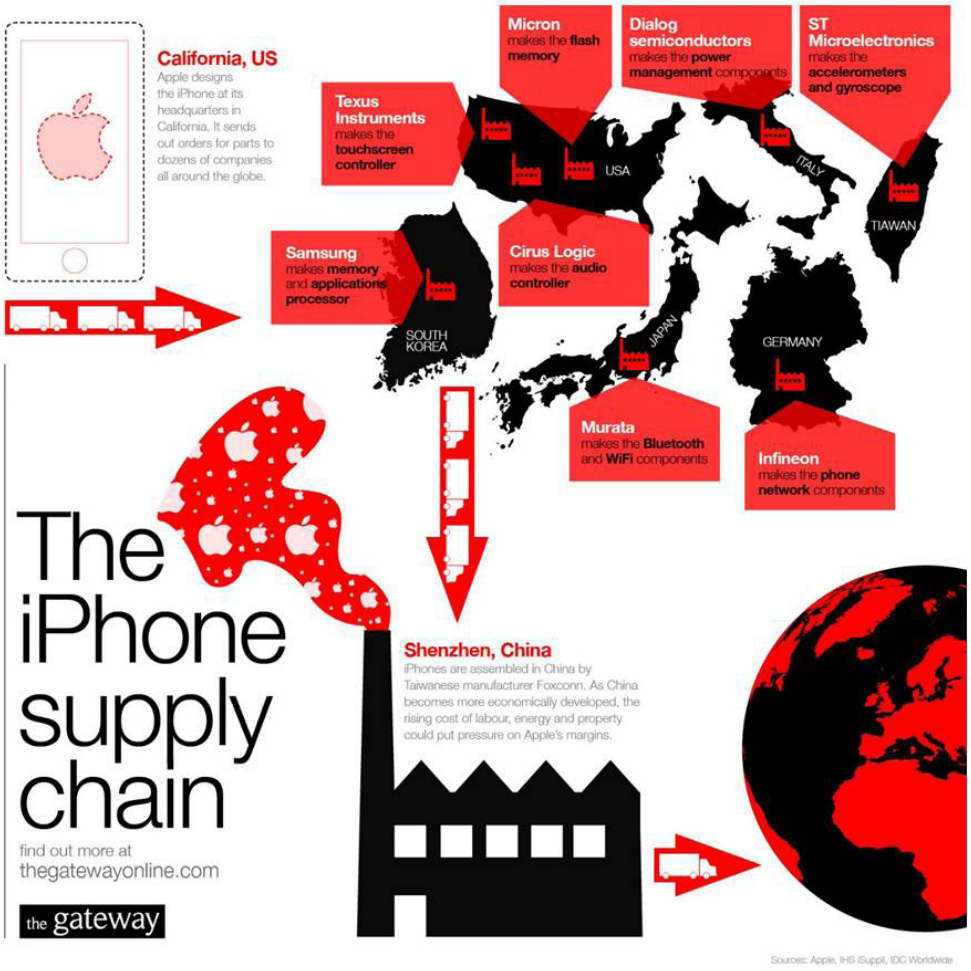
The evolution of global supply chains is linked to what economist Richard Baldwin characterised as globalisation's "unbundlings"—the unbundling of production and consumption triggered by the industrial revolution (1820s-1990); and the unbundling of stages of production, or offshoring triggered by the information and communications technology revolution (1990s-present).[1] Baldwin also proposed a "third unbundling", the unbundling of physical labour from the individual due to developments in the internet of things (IoT), robotics and other emerging technologies that will enable workers in one location to perform physical tasks in another.[2] These unbundlings were driven by profitability—production and other tasks are offshored to countries with lower factor costs, including wages. Offshoring is also driven by a country's specialisation in certain activities, and a conducive regulatory and institutional environment.[3] Specialisation involves heavy costs at the outset but results in a comparative advantage and helps a country to entrench itself within the global supply chain.

Modern supply chains for many technologies are, therefore, multi-layered and vast, spanning several countries, with each specialising in specific components and services.

"Increasingly, firms across advanced and developing countries add value along these global supply chains by completing a specific task associated with the production of a finished product and then exporting it. This may be an important part or component required in the production of a good. It may even be a service that is a vital intermediate input in further production."[4]

One need only look at the humble iPhone to get a sense of the scale and complexity of these supply chains. As a starting point, look to Apple's Supplier List, which includes 200 suppliers in 25 countries.[5] However, accounting for overseas subsidiaries of the same supplier, China comprises the lion's share of Apple's supply chain, with the US, Japan and Taiwan wrapping up the top four.[6]

Figure 1: The iPhone Supply Chain



Source: The Gateway[7]

The logic board of the iPhone 12 alone contains components from nine different supplying companies, which outsource manufacture and assembly to hubs in Southeast Asia, China, and India.[8] These components can be further broken down into the raw materials that go into these chips, including semiconductor materials and rare earths,[9] which in turn can come from China, Australia, Democratic Republic of Congo or any one of the world's major producers and processors of these materials.[10]

The mind-boggling complexity of a single smartphone is a microcosm for how global technology supply chains function; the disruption in supply of a single component can disrupt the entire chain. Semiconductor supply chains, for instance, are notoriously brittle, and the world is currently seeing a global chip shortage due to the combined impact of the COVID-19 pandemic, the Trump administration's blacklisting of Chinese semiconductor firms (many of whom supply US tech giants, like Apple), and a shortage of shipping vessels and airfreight.[11] Additionally, as we head into the "third unbundling", information infrastructure is an increasingly relevant component of supply chains. The digitisation of supply chains must therefore strike a balance between transparency and security.

The combined storms of trade wars and pandemics have led to a paradigm shift in the narratives around the global supply chain. While disenchantment with globalisation is by no means a new phenomenon, the urgency around so-called "trusted supply chains" has intensified over the past two years.

Trusted Tech

A relatively new entrant in the global geopolitical lexicon, the concept of trust in supply chains has a history in defence and industrial management.[12] In the national security context, trust has typically been defined in very narrow terms. The US National Defense Authorization Act of 2013, for instance, implicitly defines "trustworthy suppliers" as those that are US-based and, by extension, easier to audit and control.[13] The literature on technology partnerships has defined trust along two parameters—capability and commitment (or intent).[14] Trust in supply chains in this literature is built through consistent ability to deliver upon obligations (transactional trust), complementary strengths (relational trust), and strategic alignment, whereby partners view others' capacity and capabilities as an extension of their own (collaborative trust).[15]

The use of the term "trusted supply chains" (and its permutations) within its current contours has truly taken off in the past two years. Amongst technology multinationals, the term is used to reassure customers and clients, and signal reliability to regulators. Lenovo's 'Trusted Supplier Program', for instance, emphasises its Kafkaesque audit system, including a 200-point questionnaire.[16] Intel's "transparent supply chain" keeps traceability at the forefront.[17] A Google Cloud blog post on their supply chain, with direct reference to the SolarWinds, hits all the notes on a robust security architecture, transparency and collaboration.[18] In most of these examples, there is a competitive element as well—rankings and the "world's best" tag all underpin industry narratives.

This competitive aspect is present in political narratives as well. Prime Minister Narendra Modi, for instance, pitched India as a favoured destination for post-pandemic reshoring of supply chains: "[The pandemic has] shown the world that the decision on developing global supply chains should be based not only on costs. They should also be based on trust. Apart from geographical merits, "companies are now also looking for reliability and policy stability…India is the location which has all of these qualities."[19]

The October 2020 White Paper by the US Cyberspace Solarium Commission (CSC) takes a similar stance, promoting globally "American and partner companies in the face of Chinese anti-competitive behaviour in global markets".[20] Intriguingly, the paper views efforts to build trusted supply chains as complementary but independent of efforts to secure said chains.

The Australian parliament's report on the impact of the pandemic on trade makes seven mentions of "trusted supply chains", and one of its recommendations proposes that the country be a "trusted and transparent partner of choice for like-minded nations".[21] The document also highlights risks to continuity of supply as an element of trust: "The key concept […] is that of trusted supply chains and trusted sources. It may be safe to have a critical element of a market supplied by a non-sovereign source, but only if the source can be *trusted* to maintain supply" (emphasis added).

Security and self-reliance march in tandem with narratives on trusted supply chains. The European Union (EU) vision for a "Digital Europe" aims for "robust European industrial and technology coverage of key parts of the digital supply chain".[22] The EU's efforts to build trusted supply chains hinges on strong and competitive European alternatives to critical and emerging technologies like microprocessors,

quantum communications infrastructure, 5G and IoT, as well as the identification and management of "untrusted" third party vendors.[23] In March 2021, India's Department of Telecommunications mandated that telecommunication providers in the country use only "trusted products" in their 4G and 5G networks, with the IT minister stating simply that "the core of the network should be Indian".[24]

The Australian parliament's report and CSC White Paper at various instances contain overlaps between ideas of trust and those of resilience. "The supplier should not be subject to major commercial or financial risk or the risk of supply interruptions due to factors such as political insecurity, armed conflict, corruption, administrative malpractice, government intervention, arbitrary policy or regulatory enforcement or vulnerability to natural and environmental disasters," the Australian report says.[25]

The Japanese Ministry of Economy, Trade and Industry's White Paper on International Economy and Trade 2020 also prioritises "resilient supply chains" that are flexible in the face of future shocks.[26] Diversification is the key strategy proposed by the paper, including support to alternate sources of bottlenecked critical goods and services.

Resilience in terms of strength and reliability of institutions and policies is a component of trusted supply chains in other state narratives as well. Case in point is the following statement by Malaysia's former Finance Minister Lim Guan Eng, "Our institutional reforms have also made our institutions more trustworthy and transparent."[27]

Defined in these various ways, what do "trusted supply chains" mean? Four threads emerge.

Security: The ability to predict, monitor and respond to threats that may affect the continuity of supply chains. Security is sometimes conflated with trust, but at other times (as in several of the documents cited in this brief) it is but one element of a trusted supply chain. This lack of clarity plagues the tech industry as well. As a post on IBM's blog notes, "There is no single, functional definition of supply chain security. It's a massively broad area that includes everything from physical threats to cyber threats, from protecting transactions to protecting systems, and from mitigating risk with parties in the immediate business network to mitigating risk derived from third, fourth and "n" party relationships."[28]

Transparency: Transparent decision processes, regular audits and responsiveness to requests for information are a staple of the "trusted supply chain" concept. This extends to the governments of the countries that suppliers are based in. Clear laws governing flows of goods and services, and transparency in governance practices and in the arbitration of legal disputes all fall under the aegis of this thread.

Resilience: Namely the ability of supply chains to recover from shocks, whether they be from natural disasters, changes in the security and economic policies of supplier nations, et al. Where security and transparency may place specific obligations on suppliers, resilience is a quality of the network in its entirety.

Likemindedness: Perhaps the least-clearly defined of the four, likemindedness appears to capture two broad ideas. The first is similarity in ideologies and, by extension, legal and political systems. Australia and the US, for instance, both emphasise democracy and open societies as a requirement to build trusted supply chains.[29] The second is common goals, which bypasses the delicate issue of the nature of a regime and resultant disagreements partner countries may have, and instead emphasises common ends. The ambiguity of "likemindedness", particularly in the latter instance, has brought together unlikely partners. Notable among these is the Quadrilateral Security Dialogue (or Quad) consisting of Australia, India, Japan and the US, which began as a coalition tailored to defend freedom of navigation in the (now) Indo-Pacific, and has since expanded its ambit to connectivity, critical and emerging technologies, and supply chains.[30]

Conclusion

The result of the increasing, politically charged scrutiny of global technology supply chains may well transform trust into one of the most valued currencies in international relations. In this vein, this brief noted the competitive aspect of the "trusted supply chain" narrative, where governments and tech giants alike have emphasised their trustworthiness as a core competency that distinguishes them in the global market.

Trusted supply chains will likewise become a mainstay in the formation of new coalitions centred on critical and emerging technologies. However, observers should not assume that this term captures the same ideas amongst the myriad of actors

that have begun to use it. The use of the term “trust” in this context can serve as a shorthand for reliability, resilience or continuity, call for the strengthening of the security of supply chains, or target adversaries.

While the drive for efficiency and lower factor costs prompted the globalisation of supply chains in the past three decades, the contours of global supply chains in the 2020s and beyond will be shaped by the evolving understandings of “trust”.

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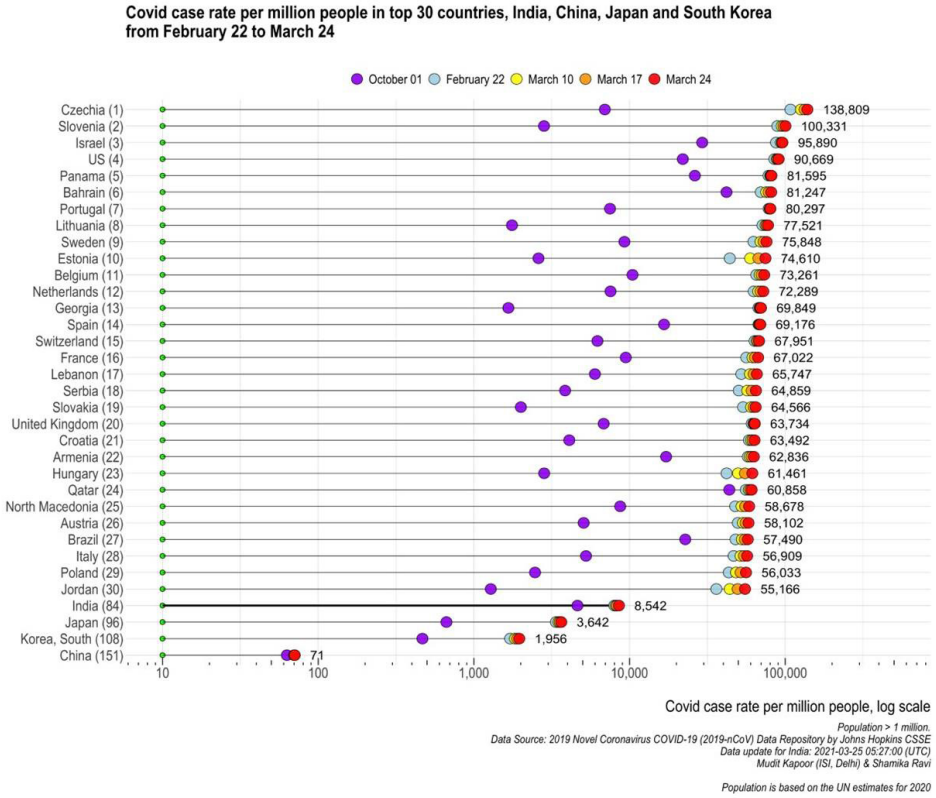
5

Can the World Collaborate Amid Vaccine Nationalism?

Shamika Ravi

The COVID-19 pandemic is undoubtedly the worst global health disaster of the twenty-first century. It has ravaged economies, destroyed livelihoods, devastated families and curtailed civil liberties in many parts of the world. But not all countries have been affected equally. Rich countries, such as the US and those in Europe, suffered a higher number of cases (see Figure 1) and casualties (see Figure 2),[1] necessitating a larger response from the developed world in the search for a vaccine.

Figure 1: COVID Case Rate Per Million Population, as of 24 March 2021

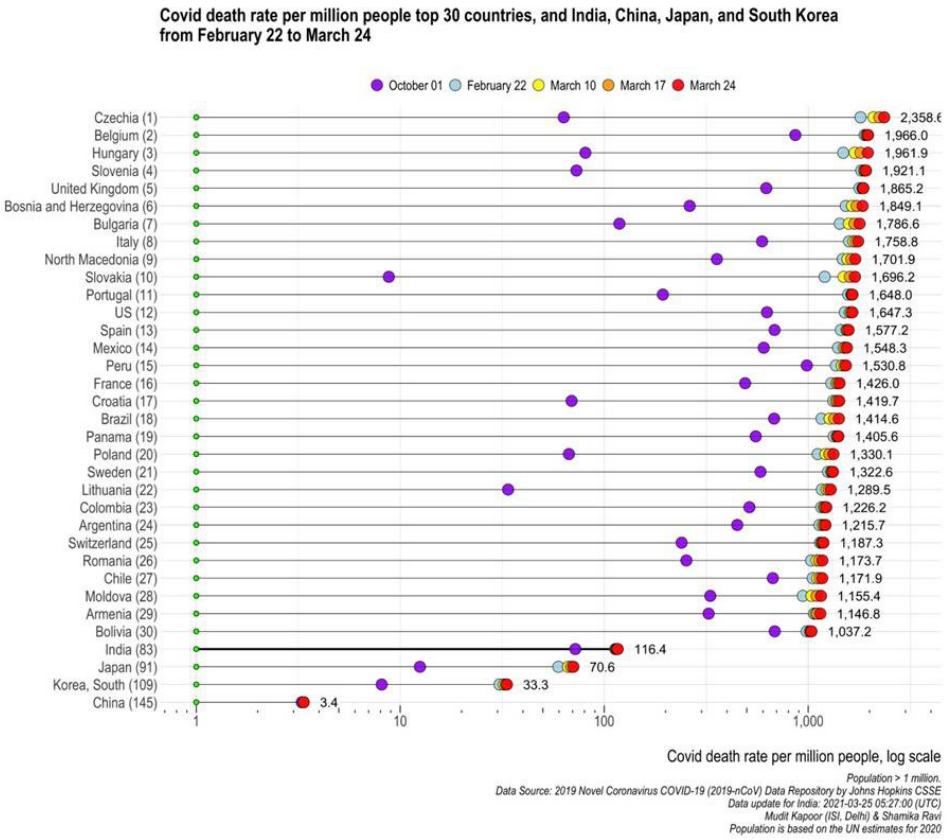


Source: 2019 Novel Coronavirus COVID-19 (2019-nCoV) Data Repository by Johns Hopkins CSSE Data update for India: 2021-03-25 05:27:00 (UTC); Population is based on UN estimates for 2020.

This is not the first global pandemic to destroy lives and nations. For instance, the Spanish flu in the early twentieth century, when medical science was not as advanced as in recent times, was far more lethal. Importantly, the Spanish flu struck during the First World War when press freedom was severely curtailed in most parts of the world, but in Spain, which was neutral during the war, the press could freely report

on cases and fatalities, ultimately giving the pandemic its name. COVID-19 has not been subjected to such restrictions and therefore captured the attention of political leaders worldwide from the early stages of the outbreak. Governments responded by locking down countries and imposing other restrictions, but the only permanent solution to the pandemic was the discovery of a vaccine.

Figure 2: COVID Death Rate Per Million Population, as of 24 March 2021



Source:2019 Novel Coronavirus COVID-19 (2019-nCoV) Data Repository by Johns Hopkins CSSE Data update for India: 2021-03-25 05:27:00 (UTC); Population is based on UN estimates for 2020.

Typically, vaccines can take years to be developed and go through clinical trials before being released for public use. But the COVID-19 vaccine was developed and released in less than a year since the outbreak was declared a pandemic. The World Health Organization (WHO) issued an emergency use listing (ELU) for the Pfizer–BioNTech COVID-19 vaccine on 31 December 2020 and granted ELUs to two versions of the Oxford–AstraZeneca vaccine manufactured by the Serum Institute of India (SII) and SKBio on 15 February 2021. Currently, 82 vaccine candidates are under clinical development and 182 vaccine candidates are in the pre-clinical development phase,[2] a remarkable achievement in global public health.

Race for Vaccines

With the discovery of the vaccine, COVID-19 has ceased to be a global humanitarian issue and has metamorphosed into a traditional political economy problem of inequality in access between the rich and the poor countries. In several countries, this has also emerged as a problem of unequal access across regions and demographics. Globally, the number of vaccine doses administered per 100 people is 6.5 (as of 25 March 2021), but there are significant variations across countries and continents. Israel has achieved 115 doses per 100 people, while the US has administered over 35 doses per 100 people and the European Union has achieved 15 doses per 100 people. Meanwhile Asian countries have achieved a modest 4.5 doses per 100 people, mostly on the back of India and China's significant manufacturing capacities. For most African countries, however, there is either no data available or they have yet to achieve even a single dose per 100 people (see Figure 3).

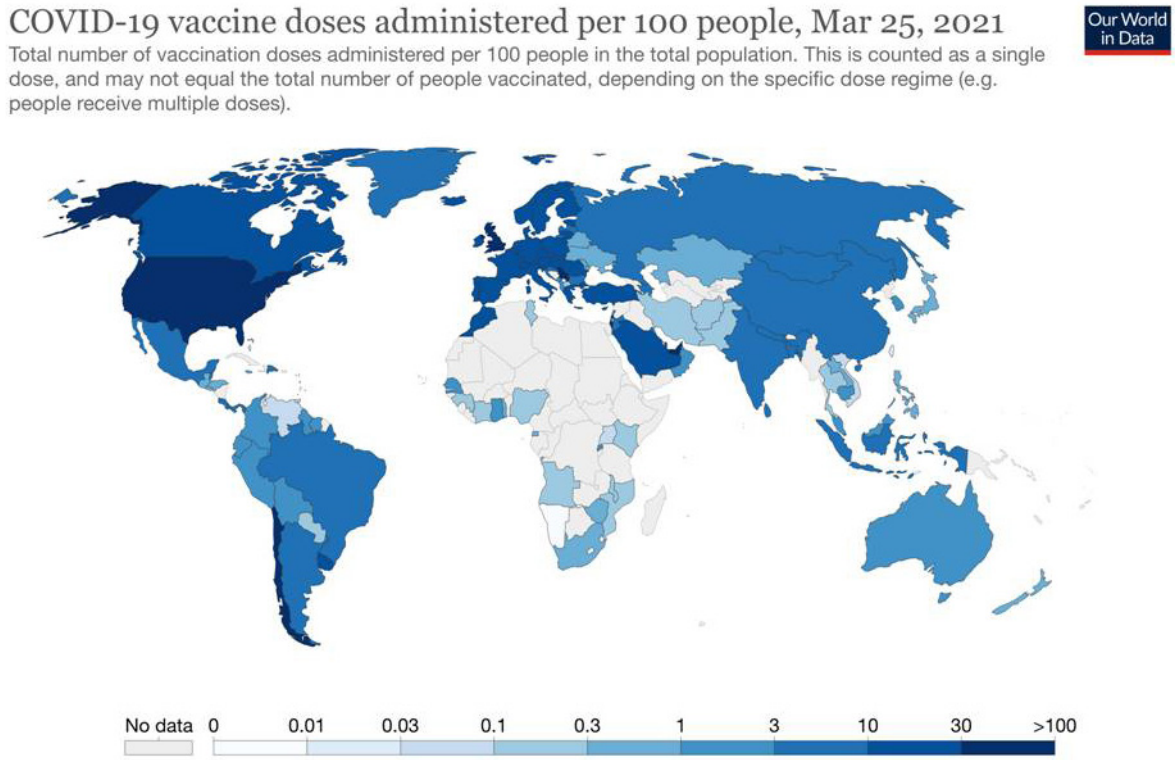
The rich countries have used their economic and political muscle to corner as many vaccine doses as possible, while most poor nations rely on the COVID-19 Vaccines Global Access—or COVAX—initiative by UNICEF, GAVI (vaccine alliance) and WHO to promote equitable access to the vaccines.[3] Despite efforts at improving access, GAVI has declared that merely 27 percent of the vulnerable population in developing countries will benefit from COVAX vaccines this year.[4] The distribution of the COVID-19 vaccines has once again exposed the reality of the world's poor, who are routinely deprived of basic human rights, in general, and justice, in particular.

There are now increasing concerns of 'vaccine apartheid'[5]—a stark inequality in global access to vaccines. While rich nations have rolled out massive vaccination drives following the availability and emergency authorisation of multiple vaccines, poorer nations see no hope of gaining access in the near future. This is despite repeated efforts since the onset of the pandemic to declare the COVID-19 vaccine a global public good,[6] including an appeal from 115 international personalities and 19 Nobel laureates to adopt legal measures to ensure it is made available free of charge to all. Experts have also made several suggestions on how to operationalise such a global drive,[7] such as a temporary waiver of intellectual property rights by the World Trade

Organization and governments to encourage emergency production to meet the global demand for vaccines. Despite repeated pleas calling for solidarity and global cooperation, rich countries have yet to adopt such measures.

Several observers have made comparisons between the emerging situation and the HIV/AIDS epidemic of the 1990s.[8] The WHO has declared that while the production of COVID-19 vaccine doses has exceeded the number of global infections, equitable access is still far from reach as over 75 percent of these doses are concentrated in the rich nations, which comprise 60 percent of global GDP.[9] The WHO has also warned against 'vaccine nationalism', adding that at the current rate, most poor nations will not have access to vaccines for at least another year while rich nations will likely complete universal vaccination in 2021. This will mean delayed global immunity. Areas of affluence will achieve COVID-19 immunity while most of the world population will continue to struggle with a resurgence in infection, economic slowdown and the perpetuation of existing global inequity.

Figure 3: Vaccine Doses Per 100 Population



Source: Official data collated by Our World in Data, accessed on March 25, 2021

Vaccine Nationalism: Threat to Global Cooperation

The main threat to global cooperation on vaccination is the growing vaccine nationalism across major manufacturing nations. Vaccine nationalism typically occurs when governments sign agreements with pharmaceutical manufacturers to pre-order vaccines, blocking the availability to other countries in the process. Other ways of practicing vaccine nationalism include when governments enter tacit or explicit agreements with local manufacturers to promote and protect global market shares for their vaccines. For instance, China recently announced a new visa policy for travellers, contingent on them taking the Chinese-made Sinovac vaccine. This is likely to have widespread repercussions since the WHO is yet to approve any of the Chinese vaccines.[10]

Wealthy countries reportedly ordered over two million doses of the vaccine even as they were in trials,[11] with several nations pre-ordering multiple doses per citizen. Governments now have more information (on efficacy and side effects) on each vaccine than they did when pre-ordering doses, and can establish clearer vaccination strategies for their populations. Under such circumstances, the massive stockpiling of vaccines—with no clear intention of using them—is myopic, selfish and suboptimal from the global perspective. The US, for instance, is holding several million doses of the Oxford-AstraZeneca vaccine but has not authorised its usage yet. Several other countries that have authorised its usage, such as Mexico, have requested this stockpile be released.[12] Although the US announced it will ship four million doses of the vaccine to Canada and Mexico,[13] it continues to hold large reserves without Food and Drug Administration approval for emergency usage. The US's reluctance to share vaccines is also pushing several Latin American countries to enter deals with Russia and China.[14]

The WHO has expressed concern over vaccine nationalism and rich countries cornering massive resources at the expense of global access. Even pharmaceutical firms appear concerned by vaccine nationalism. SII chief executive officer Adar Poonawalla has said that vaccine nationalism could derail WHO efforts to deliver two billion doses to poor and middle-income countries.[15] Wealthy countries will likely achieve immunity due to the timely access to the vaccines, but the threat from new variants and mutations will remain if most countries remain under-vaccinated.

The WHO has repeatedly warned that restrictions to getting the vaccines out widely will impact the collective ability to control COVID-19 and prevent variants from emerging. Although many pharmaceutical companies have said their vaccines are mostly effective against new variants with some "tweaks", the experience of the past year has shown that even small "tweaks" take time and can threaten new and rapid contagions.

Countries are restricting supply of materials needed to make more vaccines which is leading to long delays and missed timelines across global manufacturers. For instance, the Biden administration invoked the Defence Production Act to block export of raw materials, and SII has already announced that the move will lead to delays in the production of Novavax vaccines for global supply.[16]

Vaccines are also emerging as a means to expand global influence. Russia and China got an early foothold in Eastern Europe and Latin America with their indigenously developed vaccines.[17] These vaccines do not have authorisation from the WHO yet, however, both countries have engaged in extensive media campaigns and have emerged as major suppliers to countries across Latin America, Africa and the Middle East.[18] Given how quickly vaccines were developed and trials conducted (in less transparent ways in some instances[19]), some countries have begun to revise vaccine efficacy results after conducting their own local trials. For instance, Brazil and Turkey have lowered the efficacy of China's Sinovac vaccine. Trials in Turkey showed 83 percent efficacy and those in Brazil showed 50.4 percent efficacy, significantly lower than the claims of over 90 percent efficacy by Sinovac. At the same time, despite repeated attempts at negotiations, there is heightening tension between the European Union (EU) and UK. This has led to new rows over the supply of vaccines produced within the EU, and the EU could soon announce export bans on the vaccines.[20]

There have also been concerns regarding price discrimination practices followed by manufacturers across different markets.[21] For instance, South Africa revealed that it acquired 1.5 million doses of the Oxford-AstraZeneca at US$5.25, which is more than twice what the EU paid (US$2.15). But governments that have jointly funded the development of different vaccines have successfully negotiated for lower prices—the Moderna vaccine is cheaper in US than in Europe, while the Pfizer vaccine is cheaper in Europe than in the US. Importantly, AstraZeneca and Johnson & Johnson are the only two vaccine manufacturers to commit to not profit from the pandemic, which is why the Oxford-AstraZeneca vaccine is available at low rates around the world (about US$4) and is the leading candidate in the COVAX initiative.

More recently, the optics of vaccine nationalism has hit centre stage with several European countries suspending the use of the Oxford-AstraZeneca vaccine over concerns of patients developing blood clots. This decision will have far reaching consequences as the vaccination drive has been slow in most European countries and there is mounting domestic pressure. The WHO and drug regulators have cautioned against the hasty suspension of the vaccine citing no evidence that links it to developing blood clots,[22] with the Europe's medicines regulator saying it is "firmly convinced"[23] of the safety and efficacy of the vaccine. This jostling by pharmaceutical companies, governments and trade blocs is likely to undermine public confidence and cause setbacks to the overall vaccination drive across countries.

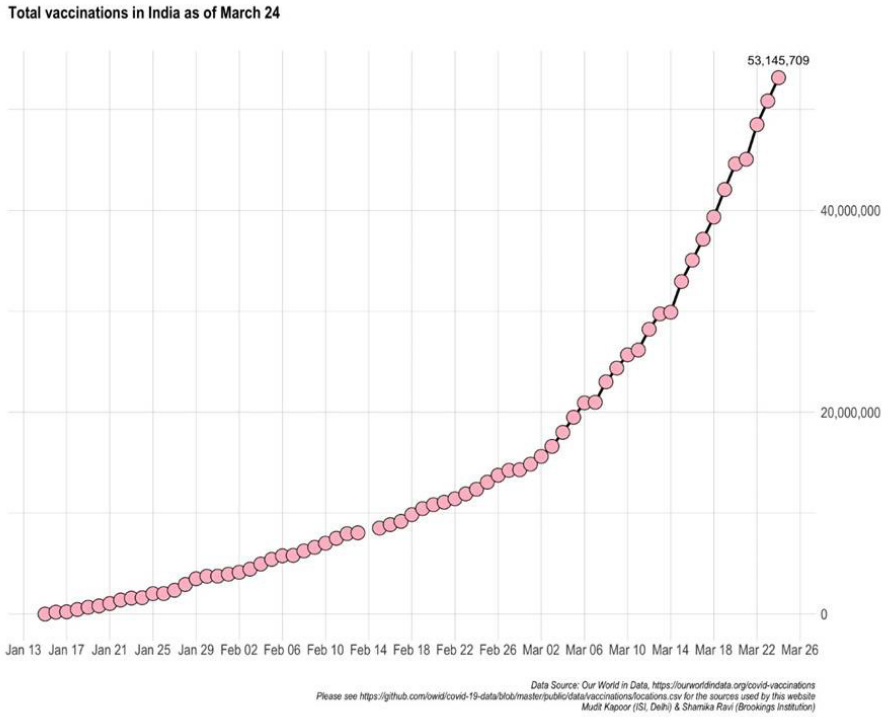
Indian Exceptionalism

Amid evolving global tensions over the vaccines, India has emerged as a key player. It remains the only major COVID-19 vaccine-manufacturing country to actively supply to the global community while scaling up its domestic vaccination drive, leveraging its position as a leading pharmaceutical and vaccine manufacturing country. According to a submission to the Rajya Sabha by Ashwini Kumar Choubey, the minister of state for health, on 16 March, India had supplied nearly 60 million doses to over 71 countries, including neighbouring nations. By July 2021, India plans to vaccinate 300 million people across the country, and has rapidly scaled its vaccination drive since it began in January (see Figure 4). India has also benefited from local administrative capabilities that have developed through the experience of previous vaccination drives, such as those for polio and smallpox.

India is currently mass producing two COVID-19 vaccines—Covaxin, indigenously developed by Bharat Biotech in collaboration with the Indian Council of Medical Research and National Institute of Virology; and Covishield, as the Oxford-AstraZeneca vaccine manufactured by SII is known locally. Covishield, one of only two vaccines approved for ELU by the WHO, is among the most widely administered COVID-19 vaccines globally.

India is not only supplying vaccines to other countries but is also participating in several initiatives to share clinical research and knowhow regarding mass vaccinations; the government is holding a series of training camps for partner countries like Bangladesh, Brazil, Bhutan, Myanmar, Oman and Nepal.[24] At the

Figure 4: Total Vaccinations in India (as of 25 March 2021)



Source: Official data collated by Our World in Data, accessed on March 25, 2021

recently concluded Quadrilateral Security Dialogue between India, US, Japan and Australia, the countries pledged to "expand and accelerate" COVID-19 vaccine production in India and to supply a billion doses of the vaccine across Asia and the Indo-Pacific by 2022.[25] The US International Development Finance Corp will provide financing to Indian manufacturing firm Biological E to produce at least one billion doses of the Novavax and Johnson & Johnson vaccines, with supporting finance from Japan through concessional yen loans for India.

Conclusion

Amid escalating vaccine nationalism, is there any hope for global cooperation? The COVID-19 pandemic has mutated into a global political economy crisis, with new fault lines emerging along market shares and intellectual property regimes. Although the scientific knowhow and technology solutions have been developed in time through collaboration between governments and business entities across countries, the

new constraints to the equitable access of vaccines arises from trade protectionism and limits to technology sharing due to existing intellectual property regimes. The uncertainty of the virus is being overshadowed by the growing uncertainty from vaccine nationalism. The challenge now is to expand vaccine production capacity and improve market access, which cannot be left to voluntary cooperation alone and must be resolved through global leadership to urgently transcend existing fractures. Global cooperation needs compulsory and explicit action. India has shown the way by becoming a major global vaccine supplier while simultaneously scaling up its domestic vaccination drive. Will wealthier nations follow this example?

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6

Nuclear Insecurity: How Can We Tame the Proliferators?

Rajeswari Pillai Rajagopalan

Nuclear non-proliferation has remained one of the greatest challenges to international security since the 1960s, although the early fears of large-scale proliferation did not come to pass. This is partly because of concerted action by the great powers such as the US and the Soviet Union. However, in the last two decades, for a variety of reasons, the threat of proliferation has heightened. As the world moves towards a period of flux, with shifting power balances and unclear global responsibilities, there is growing danger that proliferation could accelerate. This is driven by the desire in some countries for greater security and also by the spread of nuclear technology that now makes the supply side of the problem even more difficult than it was in the early decades. It is important to acknowledge and address the two kind of proliferators that exist—countries that develop nuclear weapons to beef up their own sense of security and countries that supply nuclear technology for varied reasons, including financial and strategic. To address the challenge of nuclear non-proliferation, both the demand and supply side of the problem have to be attended to.

The Demand Side

The demand side of the nuclear challenge has aggravated because of growing national insecurity at the regional and global levels. At the regional level, two Nuclear Non-Proliferation Treaty (NPT) challengers—Iran and North Korea—stand out.

The Iranian nuclear issue has remained a major challenge to the NPT. Tehran's desire to become a nuclear weapons power is well known, despite Iran reiterating every so often that it is not pursuing nuclear weapons. The Iranian efforts to acquire and develop nuclear weapons originated in the 1970s when Tehran expressed its keenness to obtain sensitive technologies. The late Shah of Iran was interested in developing nuclear weapons, reportedly stating that "...if ever a country [of this region] comes out and wants to acquire atomic weapons, Iran must also possess atomic bombs."[1] The Iranian nuclear programme continued after the 1979 Iranian Revolution but the weapons programme at least appeared to have halted in 2003, possibly as a consequence of the demonstration effect of the US war on Iraq. The weapons programme appears to have been shelved thereafter but clearly not abandoned. In 2014, Iran and the major powers agreed to a deal known as the Joint Comprehensive

Plan of Action where Tehran agreed to some restrictions on its nuclear programme in return for sanctions relief. The restrictions it accepted included the level of uranium enrichment, but Iran has refused to allow inspections of military sites or access to key nuclear scientists and is yet to account for all its past activities. In a sense, Iran remains a threshold nuclear state that can build its nuclear arsenal if a political decision is made in Tehran. As Israel's successful covert operation in 2018 demonstrated, Iran has kept much of the knowledge that it gained in building nuclear weapons intact—and kept the fact that it had archived that knowledge secret from the International Atomic Energy Agency (IAEA).[2]

In a similar manner, the North Korean nuclear issue has continued to remain in a state of limbo with no clear solution in sight. North Korea became a party to the NPT in 1985, but never signed the IAEA Safeguard Agreements that would allow the agency to inspect its facilities. In 1992, after much pressure from the NPT regime and the South Korean admission that there were no US nuclear weapons on its territory, North Korea agreed to the IAEA Agreement. But the inspections that followed found several inconsistencies with the North Korean claim that it was not doing any reprocessing in any of its facilities. There were constant disagreements between North Korea, the IAEA and the US. Finally, Pyongyang withdrew from the NPT in 2003 and conducted six nuclear tests, sparking criticism from the region and beyond. The country has also been exhibiting new long-range missiles, which have heightened regional and global concerns, and the threat to even the US.[3]

International diplomacy, including the six-party talks[4] and former US President Donald Trump's personalised effort, brought few rewards. While it is unlikely that North Korea will ever give up its nuclear weapons, the international community's primary focus has been to ensure that Pyongyang does not behave recklessly, either by threatening or using its nuclear weapons or transferring its nuclear technology to non-nuclear states. But diplomacy has become a lot more complicated due to the growing tension between China and others in the region. China's role has been suspect from the very beginning because it has acted as a protector and defender of North Korea. China may continue to prevent international action against the North Korean regime, further emboldening the regime in Pyongyang.

In addition to these problems, there is a possibility that growing regional insecurities, especially in the Indo-Pacific, could force other countries to rethink their positioning on nuclear weapons. There have been murmurs in this direction in Japan, South

Korea and Australia. While these are faint for now, growing threats from a resurgent China coupled with concern about US willingness or capability to defend its allies in the region could make them louder. This could lead to a "potential tsunami of nuclear proliferation in Asia" by way of others in the region responding to North Korea's nuclear weapons.[5] This could potentially include Japan[6] and South Korea[7] gradually shifting their position on nuclear weapons.[8] As long as the possibility of nuclear threats from China and North Korea continue, states like Japan are unlikely to be comfortable in fully foreswearing nuclear weapons, even if they are members of the NPT. Similarly, there have been more open calls for South Korea to explore the nuclear weapons option in the face of North Korea's active and irresponsible nuclear shenanigans. Recent opinion polls and public surveys show that a large majority in the country are comfortable with the idea of nuclear armament—a 2017 Gallup poll, for instance, found that 60 percent of South Koreans favoured developing nuclear weapons and only 35 percent opposed it.[9] While many feel that the US's extended deterrence is the best solution, "a growing number are quietly contemplating the alternatives." Former South Korean Foreign Minister Song Min-soon reflected this viewpoint, stating that South Korea is "taking its own measures to create a nuclear balance on the peninsula."[10]

Similar concerns exist in the Gulf region as a consequence of Iran's nuclear progress. If Iran does build a nuclear arsenal, there will be pressure on neighbours, especially Saudi Arabia, to build their own or to buy comparable capability. Considering Saudi Arabia has considerable wealth, the latter possibility cannot entirely be ruled out.

The Supply Side

In addition to the demand side problem that has made proliferation possible, the supply side issue has been equally problematic, including in Iran and North Korea.

After the Iranian Revolution, Russian and Chinese assistance enhanced the possibility of an Iranian nuclear bomb. China's help in this regard is considered significant. It started technical training for Iranian atomic scientists in the 1980s and supplied Tehran with subcritical or zero yield nuclear reactors. More importantly, it helped Iran set up a primary nuclear research facility in Isfahan through a secret nuclear cooperation agreement.[11] China and Iran entered into an agreement in 1985, which went on for the next 12 years.[12] Reports indicate that between 1985 and 1996, China supplied Iran with a variety of critical nuclear technologies and machinery

and extended its assistance in getting such technologies from others.[13] During this period, Beijing also helped Tehran with uranium exploration and mining, and helped it gain mastery in using lasers for uranium enrichment.[14] This cooperation came to a halt in 1997. While both countries were keen to continue their cooperation, China's decision to find "a degree of accommodation" with the US to pursue its own economic development put a halt to the relationship with Iran. John Garver argues that China took the decision to stop nuclear assistance to Iran also because it wanted to evade global isolation that could negatively affect its economic advancements.[15] Despite Chinese and Iranian claims, reports from the late 1990s noted that China was still extending nuclear assistance to Iran, especially in uranium enrichment and conversion facilities, including a uranium hexafluoride plant.[16] While Iran is possibly at a stage where it no longer needs external assistance for its nuclear programme, the possibility that it could now become a source of such technologies or materials cannot entirely be ruled out.

Much like Iran, the North Korean nuclear weapons programme has also benefitted from assistance by the by the former Soviet Union and China. Pyongyang has been building up its nuclear capability since the 1950s.[17] The Soviet Union's nuclear assistance in the early phase was extensive.[18] China had refused to part with nuclear technology in the initial stages but Beijing's assistance to Pyongyang was critical in constructing a 50-megawatt reactor at Yongbyon, and thereafter a secret processing unit in the mid-1980s. Experts also suggest that North Korea's construction of a uranium enrichment facility around 2000 and its first nuclear weapons test in 2006 became possible with likely assistance from Pakistan's AQ Khan and was "based on uranium enrichment and nuclear design plans originally obtained from China."[19] In an essay on the China-Pakistan-North Korea nuclear triangle, Julian Schofield has argued that while China pursued a conservative approach in developing its own nuclear arsenal, its "nuclear sharing policy is liberal."[20] He says that China's interest in extending nuclear assistance to North Korea is driven by its desire to create a buffer zone, which also pushed it to not adopt any "confrontational or rollback policies against North Korea's nuclear arsenal." With North Korea now a full-fledged nuclear power, a serious threat is of it becoming a source of further proliferation.

An important set of concerns has to do with direct proliferation of technologies from countries like North Korea, Iran or Pakistan to other states and possibly even non-state groups. One of the most consequential cases of such nuclear proliferation was that of Khan, who proliferated nuclear technology and know-how to a number of

countries, including North Korea, Iran and Libya.[21] In February 2004, the Pakistani scientist confessed on television about illegally proliferating nuclear weapons technology to these three countries although General Pervez Musharraf, then military dictator of the country, denied that the technology transferred by Khan had helped in the actual development of nuclear weapons by North Korea.[22] While there is no conclusive evidence one way or the other that Khan engaged in proliferation of nuclear technology under the guidance of the Pakistani state authority, Pakistani nuclear physicist Professor Pervez Hoodbhoy stated that, "it is very hard to believe that AQ Khan single-handedly transferred all technology from Pakistan to North Korea, Libya and Iran as it was a high-security installation in Pakistan and guarded with very fearsome amount of policing and military intelligence surrounding it. Moreover, the centrifuge weighs half a ton each and it is not possible that these could have been smuggled out in a match box, so certainly there was complicity at a very high level."[23]

Such proliferation becomes a particular problem if it leads to the transfer of technology or material to non-state groups. Nuclear security and nuclear terrorism have continued to be reminders of the grave challenges that can emanate from these materials falling into the wrong hands. Nuclear security became a global issue after the end of the Cold War, rising from the fears of Soviet nuclear materials and know-how falling into the wrong hands. But the issue gained particular salience in the global security debates after the 9/11 terrorist attacks in the US. There were legitimate fears that terrorists could get hold of nuclear and radiological materials, causing catastrophic terrorist attacks in the US and elsewhere, and led to a further tightening of the global rules to ensure that terrorists and other malevolent actors did not gain access to such critical materials.

In the Indo-Pacific, there are considerable security threats from the possible misuse of nuclear and radiological materials. Several security flashpoints exist, particularly in South Asia. There are internal security issues, including insurgencies and terrorism in each South Asian country that make the region particularly vulnerable from a nuclear security perspective. Events such as the terrorist attacks in Mumbai in November 2008 continue to be a stark reminder of the kind of threats that are prevalent in the region. The presence of sophisticated terrorist groups capable of engaging in commando-style attacks make the security of nuclear and radiological materials and atomic energy facilities a high priority for security managers.

Conclusion

Sanctions and technology-aided penalties have had limited effects. In an over decade-old essay, Gregory Schulte wrote about the challenges posed by North Korea and Iran, making the case that the leaders of the two countries are "unmoved by international condemnation and pressure. To them, the prestige, security, and influence presumed to derive from nuclear weapons seem more compelling than the weak penalties and uncertain inducements of multilateral diplomacy. Another round of sanctions or talks is unlikely to change this calculus."[24]

The key question is how to incentivise nuclear non-proliferation by tackling both the demand and supply side of the equation. A major problem is whether there is consensus among the great powers on such issues. For example, while China's interests, at least on the surface, appear like that of the US and other regional powers, there are also important disagreements. The Chinese and American perceptions on the issue of stability in the Korean peninsula are quite different, for one. For the US and Japan, the major concern is North Korean possession of nuclear weapons. Japan, South Korea and the US would like to see the denuclearisation of North Korea. But Chinese interests seem to be to ensure that the regime survives because Beijing appears to fear that a North Korean collapse could prompt a large influx of refugees into China. Additionally, China would not want South Korea to take over the North after a collapse. Therefore, the Chinese interests are driven by narrower perceptions of North Korean stability.

As long as there are such diverging interests, the larger goal of nuclear non-proliferation will struggle be promoted. As conflict between China and the US and its allies intensifies, the common ground is likely to shrink, and with it, the prospects for concerted action on the issue by the great powers. In fact, we are potentially entering a new decade of uncertainty and insecurity arising from a failing consensus on nuclear non-proliferation.

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7

De Facto Shared Sovereignty and the Rise of Non-State Statecraft: Imperatives for Nation-States

Lydia Kostopoulos

State sovereignty has been a foundational pillar of international law dating back to the Peace of Westphalia in 1648.[1] It has played a critical role in the rules-based order the world has come to operate under and determines how nation-states interact with each other in times of peace or in conflict. Our modern understanding of state sovereignty can be traced back to the Charter of the United Nations (UN) from 1945, which stated: "nothing [...] shall authorize the United Nations to intervene in matters which are essentially within the domestic jurisdiction of any state."[2] This was an important moment, with nation-states rallying together to support the principles of state sovereignty and human rights. In 2021, both these ideas have been challenged in ways that the UN and countries have not adequately addressed using their sovereign authority.

Over the first two decades of the twenty-first century, state sovereignty in the digital space has been shared with technology companies as they maintain digital sovereignty in their platforms across borders by providing critical digital infrastructure to citizens and businesses. Additionally, the non-state portion of digital sovereignty, where technology companies arbitrate the rules, requires a reimagined and more nuanced revision of the Universal Declaration of Human Rights.

Nation-states retain their sovereign authority to legislate and conduct statecraft in the interest of their citizenry. However, this authority needs to be wielded with more urgency and in a co-creative manner involving the sovereign state, its citizens and technology companies. Sovereign states can work with technology companies to shape a stable future with equity for all by:

- Building equitable, transparent and accountable smart infrastructure; and

- Mitigating and managing technological unemployment and industry disruption

The traditional legislation format (complex bureaucratic processes and lengthy deliberations) is not suitable for the pace with which technologies rapidly reach critical mass and transform industries. The traditional understanding of "foreign" or "state" affairs as one that involves other nation-states is outdated when big technology companies like Microsoft, Facebook and Google serve billions of people.

When social media services can de-platform a democratically elected sitting leader without consulting elected representatives[3] and when the world's biggest search engine can refuse to pay journalists who are being defended by their sovereign political representatives,[4] the pre-twenty-first century concepts of sovereign borders and authorities are unequivocally challenged. Nation-states will need to establish offices of non-state affairs to directly handle state relations with big technology companies, and politicians will need to more urgently deliberate and reflect on the responsibility, duty and authority of the sovereign in digital territories that have economic, social, political and health ramifications within the nation's territorial sovereignty.

In this de facto shared digital sovereignty space, nation-states must revisit what statecraft— particularly non-state statecraft—should look like in what is expected to be a decade of the most accelerated growth in human history, and one that will have implications for centuries to come.

Building Equitable, Transparent and Accountable Smart Infrastructure

Many of the most successful and prominent cities owe a large degree of their success to the infrastructure that was naturally available to mobilise people, goods and services. Coastal cities flourished quicker, and the trade of goods, ideas and tools accelerated their advancement. Urban spaces with the ability to develop physical infrastructure thrived amid the previous industrial revolutions. The Fourth Industrial Revolution, on the other hand, is dependent on digital infrastructure. The digital revolution builds on existing internet infrastructure and will realise its potential with the convergence of several technologies—artificial intelligence (AI), sensors, internet of things (IoT), bioinformatics, robotics and quantum computing. The competitive advantage lies in harnessing digital infrastructure to create value at scale, more efficiently and at lower costs. However, unlike previous industrial revolutions that were grounded in physical reality and space, the digital revolution is, for the most part, ubiquitous and in the cloud, operating on proprietary corporate algorithms and software. Big Tech companies such as Google, Amazon, Microsoft and Apple and social media giants have created digital infrastructure that has become a public utility and a corporate necessity. As such, they have become sovereigns of a large part of digital territory operating across state borders. The sovereignty over digital territory by private companies will only expand as smart

infrastructure becomes prevalent in smart cities, smart ports and smart agriculture. Nation-states have the sovereign authority to create and uphold legislation to ensure that users' privacy and rights are respected and that digital infrastructure is designed with incentives that benefit society at large and encourage individual growth at all stages of life and opportunities for small business to flourish. For the Fourth Industrial Revolution to create opportunity and equity for all, governments must proactively co-create that future with Big Tech. There are three ways this can be done:

(1) **Financing the infrastructure of tomorrow:** The infrastructure of the future must be built today. Our present-day economies benefit from the infrastructure that was built by previous generations who bore the costs. In her special address to the World Economic Forum (WEF) Davos Agenda Week, European Commission President Ursula von der Leyen said that "public funding alone will not be enough"[5] to counter the climate challenges that the world is facing, and that sustainable corporate governance is needed. This is also true for developing and building next-age infrastructure.

The COVID-19 pandemic has strained economies around the world and governments have had to spend money for relief and support to citizens and small businesses and for vaccines, all large previously unanticipated expenses. In the meantime, many large technology companies have seen tremendous growth in revenue, valuations and demand for their services and products. Public funding alone will not be enough to posture the infrastructure against climate risk, nor will it be enough to build all the smart infrastructure needed for societies to reap the benefits of the advancements of technologies. Smart hospitals, smart grids, smart ports, electric vehicle charging stations, upgraded public transportation are some of the infrastructures that are needed. The private sector, particularly Big Tech, should subsidise the costs to build this infrastructure with government oversight. Just as the government acquires revenue from people's taxes, Big Tech acquires (a significant portion of) revenue from people's data. Part of that revenue should contribute to infrastructure-wide advancement. Governments can develop a tax programme with Big Tech to utilise tech tax revenue for the modernisation of public infrastructure.

(2) **Provide legal and legislative frameworks to protect against technological violations of human rights:** The Universal Declaration of Human Rights needs to be collectively reimagined in the digital age where it is

impossible to engage meaningfully and gainfully in society while opting out of algorithms and smart infrastructure. Governments need to step in and work with the firms providing this infrastructure and building these algorithms to ensure that they do not invertedly exclude segments of the population or marginalise small businesses. More importantly, governments need to leverage their sovereignty into the digital space. Discussing free speech, Big Tech regulation and the role of government, Google CEO Sundar Pichai said: "There are boundaries that as a society we need to agree on.... it is important for governments to debate this and give clear guidance. The answers are going to vary. There is no one size fits all. But I think we need clear rules of the road. There are a variety of approaches governments are looking at. Ensuring that policies are transparent, positions are explained, people have a way to appeal those decisions and overall companies issuing transparency reports. Like we have done with privacy and GDPR [EU's General Data Protection Regulation]."[6] Indeed, the GDPR is an excellent example of sovereign nations collectively articulating expectations, and the bounds of acceptable and non-acceptable behaviour in the digital space in relation to the data and privacy of EU citizens.[7] Similar directive legislation is needed for urban surveillance technologies used by public municipalities, the capture and use of data derived from medical IoT at hospitals, geographic data from transportation ride hailing apps, and digital marketplaces where small businesses sell goods and services, among other areas.

(3) **Aggressively work with industry to minimise, mitigate and stop cyberattacks:** The digitisation of infrastructure creates a larger threat potential for cyberattacks, meaning more vulnerabilities and more attacks that in turn will further threaten critical infrastructure and the ability to provide services. In his reflection on the first year of the COVID-19 pandemic, Yuval Harari astutely pointed out that humans have never been more powerful against pathogens.[8] Harari highlighted contemporary technological advances in gene sequencing and the rapid means to exchange information as the reason for producing vaccines in record time. Similarly, information technologies allowed for digital surveillance of the virus and the ability to contain it more effectively, and empowered economies to stay active through the lockdowns. At the same time, robotically-enabled smart and precision farming allowed for the generation of food, with a fraction of the people needed during the last pandemic in 1918.[9]

Human life has flourished because of advances in information technology, and it is not possible to revert to a pre-information technologies economy. These technologies have cyber vulnerabilities that have existed and will continue to exist, meaning successful and unsuccessful cyberattacks will persist. As much as security can be factored in, there will constantly be risks that need to be managed and mitigated. As more infrastructure becomes smart, successful cyberattacks have the potential to be fatal (for instance, water infrastructure attacks), cause an economic collapse (for example, an attack on the SWIFT system and big banks), or starve the population (such as an attack on precision smart farming infrastructure). Sovereign states must ensure the safety and security of a nation's infrastructure, now undeniably tied to cybersecurity. Mechanisms must be put in place to hold technology companies accountable for the defence and protection of such infrastructure.[10] Several countries have attempted to work more closely with industry to share cyber-related information, such as with the Federal Bureau of Investigation-led InfraGard initiative[11] or the European Cybersecurity Organisation's Public Private Partnership programme,[12] but deeper ties are needed to defend against malicious attacks in this growing threat landscape. Now, it is important to consolidate what constitutes infrastructure and to recognise that technology firms contribute to stability and provide digital critical infrastructure that economies depend on.

Mitigating and Managing Technological Unemployment and Industry Disruption

Through the process of exponential growth (in what Singularity University Executive Founder and Director Peter Diamandis describes as the "Six Ds of Exponentials"[13]) digital technologies become widely accessible and gain critical mass. This opens the door for new convergences of technologies and disruptive innovation from smaller companies, and new opportunities to pivot by established organisations. History is witness to waves of disruptions—what digital music aggregator platforms did to the music industry, what the digital camera did to analogue photography,[14] what streaming on-demand movie services did to video rental stores,[15] or what on-demand modular and just-in-time learning through free video (or Massively Open Online Courses) platforms are doing to the traditional education system.[16] To a large degree, these disruptions could have been anticipated. Ultimately, it was not so much that technology allowed newcomers to take over established market players, but it was the

lack of appreciation for change by those who were in key positions in market-leading companies. It is important not to ignore the lessons from these disruptions, as many more are on the way. In the healthcare sector, Big Tech is looking to revolutionise the medical industry[17] and small businesses are looking to bring digital efficiency to specific segments in healthcare. Similarly, several companies are on course to revolutionise the transportation sector through autonomous vehicles,[18] vertical lift transportation as an alternative to ride-hailing,[19] and hyperloop transport as the alternative to passenger trains.

These types of first-order disruptions will be accelerated by technologies that automate parts of the value chain previously served by human expertise. For the most part, information technologies and robotics replaced or augmented "routine middle-skilled jobs such as machine operation, construction work or administrative work, they have also led to an increase in complementary, non-routine high-skilled jobs (such as managers and professionals) and in low-skilled jobs (like agriculture, cleaning and personal care services)."[20] However, advances in AI and machine learning suggest that portions of the value chain will be taken over by technology and that there is a job-loss risk for low-skilled and even educated workers.[21] The greater concern is that these people will not have the ability or opportunity to acquire new more marketable skills. Nation-states must proactively facilitate and encourage collaborative education options between universities, Big Tech, industry and online education platforms. Primary and secondary education must be reimagined to transform the upcoming labour force to prepare lifelong learners.

According to the UN, "the global population of 65 and over is growing faster than all other age groups."[22] With a relatively smaller population active in the labour force, technological unemployment compounds the tax revenue cash flow problem as there will already be fewer people in the labour market to pay income tax because of retirement. Nation-states should reconsider the modern safety net in such a situation and how it needs to meet contemporary demands with fewer participants in the labour market as more receive state benefits, considering healthcare costs and the social infrastructure needed to support larger older populations.

In his special address at the WEF, Indian Prime Minister Narendra Modi emphasised humanity's role amid technological advancement. He said, "The Corona crisis has reminded us again about humanity as a value. We have to remember that Industry

4.0 is not about robots but about human beings. We have to ensure that technology becomes a tool for ease of living and not some kind of trap. For this the entire world needs to act together, we all have to act together."[23]

Ultimately, society and governments, together with big technology companies and other industries, need to collectively reimagine what work is—the amount of time that is spent doing it, its connection to an individual's identity and what *fair* compensation is. This requires an honest appraisal of changing times and the courage to think about imaginative solutions. Failure to do so and operate under the previous century's paradigm will stifle progress for decades to come.

The Tension That Remains

The Fourth Industrial Revolution has created complexity in the international power model of state sovereignty. The tension that exists is because the pre-digital revolution power asymmetry between Big Tech and the nation-state is decreasing. The companies who own the digital platforms used by billions of people regulate those spaces with their 'terms of service'. For instance, Google and Apple command 100 percent of the smartphone market with their Android or iOS operating systems, and can thus decide what apps are allowed and what apps violate their corporate terms of service. Anti-trust investigations are underway in the US to assess the app monopolies and identify equitable regulatory measures.[24] In the UK, the Supreme Court "ruled that [Uber] drivers are to be recognized as workers with entitlements to the minimum wage and holiday pay".[25] And the success of the GDPR is an excellent example of liberal democracies uniting through a coherent strategy to protect privacy by imposing standards on data.

These examples tell a story of countries that are coming to terms with digital and technological value propositions and their nuanced needs for regulation. But there are many other complex issues currently (such as freedom of speech, algorithmic prominence and digital marketplace monopolies) and those that lie ahead (such as who gets access and how to life-saving medical algorithms derived from data from wearable devices or who owns digital clones).

This tension between technological human rights, marketplace equity and digital monopolies is more present in public debate now than ever before. While there have

been some successes in governments championing the rights of their citizens, it is the tip of the iceberg of the regulatory challenges and needs ahead as social justice movements continue to gain momentum and economies struggle with increasing inequality and economic opportunity post-COVID-19.

As nations assert their sovereignty in the digital space, it is important to appreciate the current environment where the digital territory has been conquered and some corporate services such as Google Search, Google Maps, Facebook and Amazon have become forms of a public utility at various levels for different segments of society, challenging the sovereign. Nation-states have a place to reassert themselves. However, they must understand how the statecraft playbook is changing and how traditional forms of state power projection are not the best or most effective approach in this international digital ecosystem that operates ubiquitously across borders.

Speaking on rapid technological change and government regulation, Singapore Senior Minister Tharman Shanmugaratnam advocates for a hybrid synergy approach. Using the example of digital currency, he said:

"[Governments] should not try to crowd out entirely the private sector players, those private sector digital wallets, tokens or stable coins… don't crowd them out entirely because they will be a source of great innovation, but they cannot be left on their own. The payment system is a public good, it needs to be regulated, it needs to be interoperable, it needs to be safe, including safe from cryptographic incursions and it needs to have the necessary transparency to avoid the risk of money laundering and illicit finance."[26]

Conclusion

Statecraft is defined as the skill of governing a country[27] and the art of conducting state affairs.[28] However, just like our industries, workplaces, cities and societies, statecraft is also evolving. State affairs include thorny questions about DNA editing, digital human clones, algorithmic bias, robotic liability, machine derived income tax, privacy and informed digital consent, and these dilemmas are evolving at a rapid rate. In the next decade, governments and policymakers have important urgent work to do to regulate and promote technological advances simultaneously.

For nation-states to help their citizens reap the Fourth Industrial Revolution's benefits and assist the national industrial base through disruption and technological change, they must step up as sovereigns to support and facilitate the co-development and co-creation of the future with its citizens and industry, including Big Tech. This must be done in a way where governments ensure safety and equity for all and uphold human rights inside and out of the digital spaces we inhabit.

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8

Digital Biases: The Chimaera of Equality and Access

Nanjira Sambuli

The COVID-19 pandemic has been a catalyst for the adoption of and reliance on digital technologies, especially internet-based ones. Measures like working and learning online and disseminating information regarding the virus have been executed virtually with varied success. A 'new normal' is emerging, one that incorporates using digital technologies in practically every area of contemporary society. It is ushering an age of digital interdependence in which "peaks are yet uncharted and their promise still untold, but the risks of losing our foothold are apparent," as described in the report of the UN Secretary-General's High-Level Panel on Digital Cooperation.[1]

The pandemic has brought into sharp relief the inequalities in access to public goods, such as health and education, worldwide. It has been no different for accessing digital technologies, as they increasingly become a lifeline. It is making evident that the availability of an internet connection, for instance, does not directly translate into the affordability of nor accessibility to that connection. The assumptions, hopes and hype surrounding the advancement of digitalisation have all come up for questioning and, in the process, have showcased that there are more than just technical determinants to the successful adoption of digital technologies.

Digital Connectivity Biases and Development Narratives

Digital connectivity narratives mirror development ones. Developed nations are assumed to be well connected, with developing ones lagging. However, the transitions to the virtual domain necessitated by pandemic mitigation measures have exposed the chimera in the availability and affordability of the internet, even across Europe and the US. The "presumption of the connected"[2] in the US, for example—that broadband reaches everyone, the false equivalency of networks, and that mobile can pick up the slack for fixed broadband—have compounded socioeconomic inequalities, particularly in access to education. Students, particularly from lower-income households,[3] have struggled to adapt to remote learning, owing to insufficient (smartphone-only) connections, unaffordable access to the internet and connecting devices at home, or a lack of them altogether.[4] In the UK, families from poor and vulnerable populations have had to contend with feeding children or paying for Wi-Fi to facilitate online education.[5] Meanwhile, teachers in Italy realised early on in

the pandemic that e-learning will only benefit some students,[6] essentially those with ready access to resources such as steady internet connections, computers and tablets, which are not a given in every household.

In public health, the feverish solutionism of contact tracing apps, which were rolled out across developed nations, has been dampened by the reality that it takes more than just connecting the smartphones that are in people's hands to notify them of potential exposure to the virus.[7] The dynamics shaping how people engage within their communities and their trust in institutions, especially public ones, is a strong determinant for the successful deployment of any technology.[8]

If these digital disparities are prominent across powerful economies, as the past year has exposed, it is a reckoning then, that the 'digital revolution' is not a rising tide lifting all boats. Inequalities in how individuals and communities access and use digital technologies exist everywhere and take varied forms. While often discussed as a chasm between the connected and the unconnected, it is increasingly evident that digital divides are prevalent even among the connected.

Illusions of Digital Access and Affordability

The divides in internet connectivity are a useful analytical starting point. While, for instance, approximately 85 percent of the global population is covered by 4G mobile network,[9] this only translates to just over half of the global population being online as of 2019.[10] As the internet increasingly becomes a must-have, ensuring equitable access is a pertinent and complex, if elusive, goal. 5G connectivity—anticipated to cover one-third of the world's population by 2025[11]—has generated excitement for its potential to vastly increase internet speeds and enable more connected devices to power Fourth Industrial Revolution phenomena, such as the Internet of Things and Smart Cities. These demand faster device connections to generate real-time data and even predictive insights, such as in traffic management, a potent challenge in many urban areas. This demand and supply of faster generation connectivity (6G is currently under development), while compelling, risks exacerbating and even creating new connectivity divides.

There is a risk that those who are still unconnected to 3G and 4G connectivity will be further left behind. Network service providers investing in faster connectivity will be more incentivised to focus on areas with existing infrastructure—predominantly

urban areas—rather than setting up from scratch, which can be high risk, long-term undertakings that delay returns on investment. In the case of scant or no network coverage, such as in rural areas— 17 percent of rural areas in the least developed countries have no mobile coverage at all[12]—it is unlikely that service providers will leapfrog right to 5G or 6G to connect those who are yet to be served by existing networks. Islands and archipelagos, mountainous and remote areas, and landlocked countries demand steep infrastructure investments, such as international transit capacity, consequently affecting the cost to connect people.[13] In this paradigm, the uncovered could remain off-grid, while those currently covered gain faster coverage, thus widening *accessibility divides*.

Affordability divides for both the internet and connecting devices are also prone to widen as we migrate to faster connectivity networks. Internet affordability—defined by the UN Broadband Commission as 1GB of mobile broadband costing no more than 2 percent of the average monthly income[14]—remains unattainable for millions, with 1GB costing up to 20 percent of average monthly salary in some countries.[15] Adding to this the cost of internet-enabled phones prices digital connectivity out of reach for many globally, even in developed nations.

Nor does having access to an internet connection equate to having a meaningful online experience. Mobile connectivity is a convenient yardstick for assessing internet coverage and reach. Nonetheless, mobile-only internet connectivity can be limiting, particularly in an increasingly digitised world of work and learning. The mobile phone is an effective tool for consumption but quite limiting for creation.[16] One, for instance, will be vastly limited in learning or writing code purely through a smartphone; they will likely require access to a computer device, yet another cost factor in connecting. Therein lies a subtle divide, between mobile phone-only versus mobile and computer-enabled internet access, one that is prone to disfavour those with lower and fewer income opportunities.

Disparate entry points into the digital world do not necessarily converge towards equity once people are connected. A distinguishing success factor for maximising digitalisation's potential is the existing digital skills of individuals and communities. This is strongly linked to educational opportunities; schools serve as important nodes for cultivating technical and critical skills to be a consumer and a prospective creator and contributor in digital economies. Formal education already contains glaring inequalities in availability, access and quality, further exacerbated by the disruptions

brought on by the pandemic. Approximately 1.5 billion students in primary, secondary and tertiary education worldwide have been affected by school closures owing to the COVID-19 pandemic.[17] In many communities, schools are a crucial—and even the only—avenue through which learners can be exposed to computers, the internet and skills-training opportunities. Enjoying the benefits of e-learning, edtech and other digitalisations of education is contingent on the availability and access to such opportunities, at home or within the community, which is far from the case in many parts of the world. S*kills divides* exist in varied forms, presenting yet another hurdle to digital equality. Over time, they are also generating gaps between digital producers and consumers, an issue that warrants special attention. Furthermore, a *language divide* is crystallising as more and more people get digitally connected. It has been estimated that 95 percent of languages will never gain traction online.[18] English is and has been the 'lingua franca' of the internet, even as other languages gain ground at the content level. However, if you do not speak English, you are likely to be disadvantaged, as it still holds sway in areas such as coding.[19]

These are glaring examples of 'legacy inequalities' (such as income) appearing alongside emergent ones brought about by the march towards digitising. Understanding digital (in)equality then requires a continuous inquiry to unearth these nuances and expand upon them.[20] Income, for instance, is also a function of sociocultural norms. Women earn less or are not 'allowed' to earn an income and are denied education opportunities in many communities, which means that they are even more exposed to access, affordability and skills divides, compounding these digital dynamics to create *digital gender divides.*[21]

Chimaeras After Access

The internet was once envisioned as an equaliser—a space in which once one gains access and can navigate and create freely. Today, it is predominantly encountered and experienced as a series of platforms, especially for new users. Social media platforms have been instrumental in connecting and community-building as people from different walks of life transcend physical borders and congregate online, exploring shared and disparate interests. In many countries, social media applications can constitute the entirety of people's internet experience.[22] Popular applications are often zero-rated against one's mobile internet subscription by their network provider, making them accessible at no additional cost. Having to pay then to access the vastness

of the digital world beyond a selection of these applications can be a disincentive in this configuration.

Meanwhile, the companies behind these tools have grown into behemoths, commanding the attention of billions of people. They have identified monetisation opportunities that, over time, have made a selection of them some of the wealthiest and most influential companies in the world. In the name of improving user experience, the resultant tinkering ends up getting and keeping people hooked; algorithmic curation and data-driven experimentations are employed to fuel online consumption and expenditure. To capitalise on these discoveries, social media platforms have created enclosures—moving away from the open, decentralised web from which they benefited, to establish 'walled gardens' designed to lock in the users they attract. They have expanded from mere communication and connection channels to public utilities offering a suite of services to other institutions such as media and civic groups, thus bringing more and more of the world to the users addicted to their glitzy digital empires.

Over time, the sorting and targeting of users to present specific information at specific times—available to any actor with purchasing power to reach predetermined groups within these apps—has aggravated information divides, severely jeopardising what constitutes shared facts across societies. For the half of the global population that is online, our "epistemic wellbeing"[23] is under threat, as our access to truths, to trustworthy information sources and to avenues for participating in dialogue are poisoned by the evolution of internet platformisation that is optimised to draw and retain us in informational filter bubbles. Online civic life across developing and developed countries has been adversely affected, with serious consequences to the offline world. The pandemic has further highlighted the gravity of this crisis, leading the World Health Organization to declare a parallel "infodemic" as falsehoods and knowledge distortions about COVID-19 have spread at an unprecedented rate primarily through these online spaces.[24]

Where Are We Headed?

Information and communications technologies have presented numerous benefits, of which social media are one notable example. As is now evident, there are also severe downsides and outright dangers. In policymaking circles, the spotlight on digital

technologies has narrowly focused on the advantages and promises that digitalisation offers. Giddy public and private sector driven investments have been made to chase digital utopia illusions, not sufficiently factoring in that it takes more than just developing and deploying technology to fix any range of challenges. The pandemic has been an important inflexion point, bringing to bear the pitfalls societies have found themselves in and the role that technologies can (not) play.

For those who will successfully graduate to the future generations of connectivity, intense trade-offs abound. 5G, for instance, demands higher connection density; cellular towers have to be mounted much closer together to reduce latency and increase connecting speeds.[25] This means that it will be much easier to track and pin down users' location via their mobile networks. Urban residents will exist in hyper-connected built environments and private domains laden with monitoring devices, given the rise of internet-enabled home devices and the trendiness of smart wearable devices. As a result, they will be susceptible to loss of privacy.

Meanwhile, those who remain unconnected are being further left behind, with inequalities online and offline widening as access to essential goods and services become more technology-dependent. Their privacy, in the interim, may yet remain intact, though it will be the odd outcome of digital exclusion. As and when any generation of technologies reach them, they will intersect with other inequalities, such as in access to education and health services. Such systematic disenfranchisement will significantly compromise the agency that such communities can exercise in determining the technological investments appropriate for their context. Such 'coerced connectivity' will subject such communities to perverse, extractive technological experiences. Whether connected or unconnected, the future of digitalisation does not necessarily bode as well for humanity as technology evangelists would have us believe.

The issues we face in this decade are complex and interconnected. Digitalisation, it turns out, is mirroring the social inequalities and grievances present across societies, and in many instances, it is aggravating them. This is unfolding in developing and developed nations alike. As we become more reliant on these tools that are being developed, designed and deployed at a dizzying pace, tech companies are gaining new ground in virtually all spheres of life. They are venturing into health, education, agriculture, labour and commerce, to name a few. The rules and regulations to keep this rapid innovation and sectoral encroachment in check are lagging behind and even

frowned upon; it is common to hear the refrain that 'regulation punishes innovation'. Yet, as existing and emerging technologies are fashioned in the image of their creators and their inherent biases, they are clashing with diverse social contexts. Given the power accumulating in shaping how digitalisation rolls out, there is an accompanying imposition and encoding of an unrepresentative sample of realities into political, civic, social, cultural and economic domains. Without cross-disciplinary and intersectional policy, legislative and regulatory guardrails, these behemoths are bound to further pursue profit-maximising practices that, while registering digital progress, will be at the expense of social cohesion.

The digital disparities surfaced by the COVID-19 pandemic should give us pause. It is time to acknowledge and account for and urgently start correcting digital illusions and biases and their antecedents and emergent ones that did not exist before digitalisation. Shaping global governance for the digital age cannot afford to ignore these chimaeras. There are no quick fixes, and they are not solely technological. Improving access to digital technologies is interconnected with improving access to education and infrastructure, such as reliable energy. It is dependent on closing income and gender inequalities. It also calls for accommodating diverse lived experiences, especially those of the already excluded and vulnerable populations across every country. The global goals for sustainable development will remain ever more elusive if we do not vigorously undertake a sober intellectual and moral exercise to galvanise the collective efforts across public, private and civil society sectors to maximise digital technologies' benefits while minimising risks and harms.

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9

The Infodemic: Regulating the New Public Square

Kara Frederick

The US is reevaluating its relationship with Big Tech. In 2020, 72 percent of Americans told pollsters that social media companies have too much power and influence in politics.[1] What they sense is borne out in the data. Together, the stock market value of Amazon, Apple, Facebook, and Google totals US$5 trillion.[2] In their respective markets, Amazon is forecast to capture half of the US e-commerce retail market[3] and Apple almost 21 percent of smartphone market share.[4] Facebook boasts almost 60 percent of the globe's social media users, with 1.86 billion logging daily,[5] and Google already controls 90 percent of all general search engine queries.[6] Hand in hand with this market power, these and other US tech companies wield an inordinate amount of influence on public discourse—with implications for free speech, the body politic and technology itself.

Why does this matter to the rest of the world? Canadian professor Blayne Haggart summed it up neatly in the days following former US President Donald Trump's purging from nearly 20 social media platforms in January.[7] Haggart declared that the comprehensive digital "deplatforming" of a sitting US president and the bedlam surrounding it revealed "the extent to which these platforms…are uniquely shaped by and respond to American needs and values" and this "newfound willingness to censor problematic speech and problematic actors will almost certainly inform how they conduct their business in the rest of the world."[8] When American tech companies sneeze, the world catches a cold.

The Regulatory Landscape

Much ink has been spilled over the need for guardrails on digital platforms. British politicians, former US Secretaries of Defense, European luminaries, and international researchers all assert that authoritarians will determine the rules of the road online if democratic societies do not do it first.[9] Washington DC recognises the moment. Current energy behind proposals designed to rein in and confer safeguards on Big Tech (companies like but not limited to Amazon, Apple, Facebook, Google and Twitter) in the US capital manifest in two potential avenues—reform of Section 230 (which roughly grants immunity to tech companies from liability for content on their platforms) and anti-trust legislation. This essay will focus on major US tech companies

and explore these two potential near-term avenues in the context of the information environment, not because they represent a panacea or even the appropriate course of action, but because they stand the most likely chance of implementation in the next few years. In a marked departure from the inertia of the last two decades, both sides of the aisle in Washington now have Big Tech in their regulatory crosshairs.

The "twenty-six words that created the internet" are no longer sacrosanct.[10] On content moderation and Section 230 of the Communications Decency Act (CDA), Republicans believe these companies are doing too much, while Democrats believe they are doing too little. The "Good Samaritan" premise in Section 230(c)—that "no provider or user of an interactive computer service shall be treated as the publisher or speaker of any information provided by another information content provider"—allowed embryonic Silicon Valley companies to flourish free from innovation-strangling litigation in the 1990s and early 2000s.[11] This, along with its civil liability provision that renders interactive computer services not liable for users' speech or their own attempts to restrict access to content deemed offensive or "otherwise objectionable," is now the subject of intense focus by lawmakers. They see tech companies as the beneficiaries of special government protections that engineered their outsized largesse through the "sweeping immunity" granted by this initial bill and then extended through a slew of court decisions. On one side, certain policymakers interpret Section 230 as carte blanche for wanton deplatforming, excessive content moderation, and incoherent application of terms of service.[12] On the other, lawmakers fault Section 230 for platforms' failure to thoroughly scrub "disinformation" from their sites.[13] As such, over 20 bills were introduced to amend or reimagine this law in 2020 alone.[14]

In a departure that augurs updates are likely on the horizon, conservative stalwart and US Supreme Court Justice Clarence Thomas signaled that Section 230 reform is no longer out of bounds.[15] A willingness to consider reform by a conservative justice marks a shift in protective attitudes toward Section 230, which can be interpreted as the legislation that allowed tech platforms to grow into the economic powerhouses they are today. But any attempts to modify the legislation are subject to degrees of gradation. They range from significant overhauls (like those described in the May 2020 executive order) to additional carve outs (like those proposed in September 2020 by the Justice Department) to more subtle measures that refine specific phrasing in the text.[16] However, this movement for reform is not ineluctable. The American Civil Liberties Union (ACLU) and others have come to the defense of the moderators, calling Section 230 "critical to protecting free speech online," and promising that

its elimination would jeopardise the publication of content like "videos, photos, and tutorials… each of us is relying on to stay connected today."[17]

Lawmakers also motion to potential anti-trust legislation as another mechanism to rein in big tech. Anti-trust scrutiny grew in tandem with these companies' market dominance and consolidation of power. In 2019, Senator Elizabeth Warren publicly targeted Amazon, Facebook, and Google with threats of a break up. The Democrat-led Senate Judiciary Committee's subcommittee for antitrust reported in 2020 that "companies that once were scrappy, underdog startups that challenged the status quo have become the kinds of monopolies we last saw in the era of oil barons and railroad tycoons."[18] Four Republicans concurred with the overall findings of the majority report, and where they did not, offered a bipartisan solution to resolve the committee's concerns instead.[19] A separate 2021 bill to "fund the regulators" from Senator Amy Klobuchar would nearly double the annual budget for two agencies that share anti-trust enforcement responsibilities. The Department of Justice anti-trust division and the Federal Trade Commission would both receive an additional US$300 million per year under Klobuchar's plan, which she claimed gained bipartisan support even from Trump's White House Chief of Staff Mark Meadows before the presidential transition.[20] And both parties lauded the October 2020 filing by the Justice Department that accused Google of illegally protecting its search and advertising monopoly.[21] Along with these measures and proposals, the March Senate Judiciary Committee's first antitrust subcommittee hearing revealed indications of bipartisan overlap. How and if Washington responds to this anti-trust fervour will depend on who President Joe Biden appoints to the Department of Justice anti-trust division and the Federal Trade Commission chair and their attitudes toward implementing these years-long threats. Nevertheless, such bipartisan agreement and movement toward reform portends real action ahead. As Klobuchar noted in 2021, "we are making antitrust cool again."[22]

Implications for US Body Politic and Unintended Consequences for Foreign Policy

In their purest form, the nature of these legislative pushes against US technology companies—content moderation and anti-trust—are a direct response to their outsized impact on public discourse and how their consolidation of market power impacts individual consumers. The size, scale, and reach of digital platforms renders them *transformative*—they control the flow of information in such an expansive way

as to fundamentally shape the public square, wielding as much or more power than a government or nation-state. In an American context, this will naturally impact discourse on and raise the spectre of free speech. The deplatforming of Trump ushered these concerns to the fore. No friends of Trump, Russian dissident Alexei Navalny, Mexican President Andrés Manuel López Obrador and German Chancellor Angela Merkel all spoke out in protest of these deplatforming decisions and their implications for free speech.[23] Among civil society groups, ACLU Senior Legislative Counsel Kate Ruan stated in January that "it should concern everyone when companies like Facebook and Twitter wield the unchecked power to remove people from platforms that have become indispensable for the speech of billions…"

For their part, tech companies are vocal about an imperative to balance public safety and free expression. In his October 2019 speech at Georgetown University, Facebook CEO Mark Zuckerberg laid out this dichotomy between "[avoiding] real world harm" and promoting free speech. He reminded his employees and himself that "…as we all work to define internet policy and regulation to address public safety, we should also be proactive and write policy that helps the values of voice and expression triumph around the world."[24] Yet, in practice, this rhetoric confronts certain hard technical and market realities. Despite moderators' attempts to "err on the side of greater expression" when confronting uncertainty, content moderation—by its nature—does the opposite. Stanford scholar Daphne Keller points to an "over-removal" issue, wherein companies calculate that "the easiest, cheapest, and most risk-avoidant path for any technical intermediary is simply to process a removal request and not question its validity."[25]

Further, when companies actively insert themselves between "the user and content," they degrade user trust.[26] According to Pew, roughly three-quarters of adult Americans believe "social media sites intentionally censor political viewpoints that they find objectionable."[27] This is not helped by the uneven and opaque application of their policies and terms of service. For instance, despite a no tolerance policy of "inciting violence," Twitter did not flag Iran Supreme Leader Ayatollah Ali Khamenei's anti-Semitic tweets calling for armed resistance against Israel in May 2020.[28] The company also sat on Chinese Communist Party representatives' celebration of its sterilisation and genocide against over 1.5 million Uighers in Xinjiang before public pressure precipitated a review and takedown.[29]

Apart from economic competition, instances of collusion in the information space provide anti-trust warriors additional justification for their exertions. Big Tech's

complicity to take down the much smaller Twitter competitor Parler at the height of its popularity in January of this year is not just an example of anti-competitive behavior, but one of dominating the information environment.[30] Google and Apple's ban of Parler,[31] despite its perch atop the app store at that time,[32] is significant because together these companies control almost 100 percent of the global market share for mobile operating systems.[33] On top of that, Amazon's decision to drop its hosting service for Parler matters because it controls nearly a third of the cloud infrastructure services market.[34] This means that if decisions are made to deny service at the cloud hosting infrastructure or internet service provider level, direct access to digital viewpoints, actors or companies who run afoul of these providers is highly circumscribed. It is a good thing when tech platforms cooperate to share "signals" about security issues like child exploitation, terrorism and adversarial foreign government influence operations.[35] However, when companies work together to crush their smaller competitors and decide who has access to the new town square, as they did in the case of Parler, lawmakers may justify reaching for the anti-trust lever. Implications for the 'infodemic' are also stark: with this market share capture prompted in part by companies working together to take down alternative digital platforms and nowhere else to go, users will get pushed further and further into the darker corners of the internet.

Yet these moves by the private sector do not occur in isolation. With nearly 90 percent of its user base outside the US and Canada, companies like Facebook have a massive global reach.[36] The impact of ad-hoc content moderation decisions, combined with prodigious consolidation of power, affect the rest of the world. Global powers and partners are aware that decisions within the US will impact how these companies do business outside the US. As such, nations already dabbling in data localisation and internet sovereignty measures are primed to follow through. In a bifurcated future, where tech titans like Eric Schmidt predict a sundering of the digital world into a "Chinese-led internet and a non-Chinese internet led by America," the US is no longer the prime mover.[37] Even so, other countries are beginning to balk at this binary and assert sovereignty over their digital content and data. In January, Australia was entangled in a public battle with Google and Facebook over proposed legislation to charge for its digital news content.[38] India and Europe's forays into data localisation could potentially "tip the scales away from Big Tech" by regulating access to their citizen's data.[39] In 2021, a Canadian think tank fellow posed advancing domestic control over platforms through a "federated internet of interoperable democratic sovereign countries."[40] And all of this is still separate from measures like the European Union's Digital Services Act framework and General Data Protection Regulation,

which create data protection frameworks designed by and specific to member states.[41] These frameworks are already causing headaches for US tech companies, often to the tune of tens of millions of dollars, and are only gaining steam among the country's traditional allies.[42] The perception of inconsistent platform governance calls into question US authority over the very platforms they built.

To prevent further mishaps, debate within the US is key. The process to settle questions of the real-world harm and free expression tradeoffs should take place through an engaged citizenry, civil society groups, the free press and in courts of law. The contours of this debate should take shape as a combination of policy and tech solutions.

Green Shoots: Blending Technology and Policy Solutions

Americans must think dynamically in the context of these growing foreign policy challenges that threaten to fracture the digital world into a disjointed constellation of open and closed systems. Blending new technologies and policy is the antidote to ad-hoc fixes by tech companies and hamfisted US government regulation. On the policy side, Zuckerberg's idea for the US government to pursue a framework distinct from the binary "telecommunications company versus publisher" approach could be an opportunity taken up by a new administration.[43] This framework should be based on transparency, openness and recourse, with tech companies held accountable for their content moderation decisions. The first step would be to mandate the publication of content moderation processes and practices to help restore trust, such as through Facebook's public transparency reports.[44] In the future, instituting algorithmic transparency among these tech companies should be non-negotiable. In addition, calls for an "online Bill of Rights" and a national data protection framework to restore individual rights in the digital space are good start points.[45] Such a framework or federal privacy bill would go far in enshrining user protections. Recommendations like those contained in the final 2020 Cyberspace Solarium Commission report that call for "national data security and privacy protection law establishing and standardizing requirements for the collection, retention, and sharing of user data" are also primed for ratification.[46] Even further, new approaches to policy solutions that depend on basic principles of federalism to disseminate decisions and authority at the most local level possible are flowering. Florida Governor Ron DeSantis' 'Transparency in Technology Act' proposal aimed at consumer protection within individual states is one such approach.[47]

But these policy solutions must be complemented by the technology they govern. Companies and citizens should continue to invest in technology solutions that foster democratic values of individual privacy and openness and transparency, such as decentralisation, privacy by design and mechanisms and protocols that favor more user control. A host of alternative platforms and decentralised technologies have burst on the scene in the past few months in the US, heralded by the GameStop rebellion,[48] Bitcoin's burgeoning valuation,[49] and new ways of thinking about the internet writ large. Such a rethinking is exemplified by projects like DFINITY, which claim to create a "public internet" through a global compute platform, beholden to no one corporate entity.[50] Similarly, focusing on privacy by design, or designing in privacy protections at the initial stages of technology development, will go a long way to avoiding privacy abuses after digital tools are rolled out for the general population. Similarly, more user control through protocols like a Domain Name System, which privatises host transactions, can help institutionalise these privacy-first norms within the companies themselves, if widely adopted by multiple firms.[51] US tech sector leaders must also commit to implementing efforts like the one explained by Twitter CEO Jack Dorsey in his 2020 testimony to the Senate Commerce Committee, where he describes "… enabling people to choose algorithms created by third parties to rank and filter the content" as "an incredibly energizing idea that's in reach."[52]

American companies *acting* on these promises will be the difference between partner nations that decide to take matters into their own hands through heightened data localisation practices or the more open, free flow of data. Put simply, what is at stake is if the US's friends continue to trust the products and services coming out of the country. Social media platforms were ostensibly conceived to democratise ideas, not stifle them. They were made to distribute the power of information, not consolidate and wield it like a cudgel. Blending technological solutions with smart policy is a small step to restoring the health of free and open societies in the digital world. Convincing partner nations that the US can be trusted to do so is the first hurdle.

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10

How Finance Can Deliver Real Environmental and Climate Impact

Geraldine Ang

December 2020 marked the fifth anniversary of the Paris Agreement; at the 21st Conference of the Parties (COP21) in Paris, France, in 2015, world leaders succeeded in agreeing on a comprehensive, ambitious and universal global pact on climate change.[1] In the lead-up to COP21, a number of developed countries and multilateral institutions made significant climate finance pledges. The outcome of COP21 further urged developed countries to scale up their level of financial support, with a concrete roadmap to achieve their US$100-billion-a-year commitment by 2020. Less than 10 years remain to cut emissions by nearly half if we are to have a chance of limiting global warming to 1.5°C. Carbon dioxide (CO_2) emissions will need to be reduced by about 45 percent from 2010 levels by 2030, reaching "net zero" around 2050.[2] The "decade of action"[3] in support of climate and other sustainable development goals (SDGs) has begun, but much remains to be done.

Despite progress, atmospheric CO_2 concentrations continue to increase. Global average temperatures in 2020 were tied for the hottest on record, capping what was also the planet's hottest decade ever recorded.[4] The year 2020 also topped the previous record in terms of number of billion-dollar weather and climate disasters.[5]

In the near term, the priority will be to address the health, economic and societal crisis associated with the COVID-19 pandemic, and to ensure a durable and resilient economic recovery from this crisis. Yet, a return to "business as usual" and environmentally detrimental investment activities must be avoided; the world must commit to 'building back better' and stepping up actions for a sustainable and inclusive recovery.[a,6] Countries and regions have already made important steps towards that; for instance, South Korea's Green New Deal or the European Green Deal.[7]

Achieving climate objectives requires an unprecedented acceleration of financial flows into climate-aligned investments, and a massive shift away from investments in emissions-intensive activities.[8] While ramping up efforts for a resilient, sustainable and inclusive recovery, the transition to a green economy must be accelerated. With

a As part of its support the green recovery, the OECD is currently updating and refining its database tracking the environmental dimensions of recovery measures. The database and further analysis can support governments in setting the right signals to attract private finance for sustainable investments.

many countries aiming to achieve carbon-neutrality by mid-century, private finance for green investment must be leveraged, with governments playing a critical role in this effort. Addressing climate change will require a significant increase in green finance and investment at a time when investment is falling sharply. Achieving the objective agreed in the Paris Agreement—limiting global temperature increases to well below 2°C from pre-industrial levels—requires all forms of finance, whether private, public or blended finance. Mainstream private finance is particularly indispensable to help companies realign their business models towards net-zero emissions pathways.[9]

Take India, for instance. In 2019, India announced an ambitious target to reach 450 GW of renewable power by 2030. India's nationally determined contribution estimates that the country will require around US$170 billion per year for climate action.[10] There are some positive signs—FDI in India increased by 13 percent in 2020 and the country has a fast growing energy sector.[11] A recent study estimates that in 2018, India received green financing worth US$21 billion.[12] Still, it is clear that meeting India's climate and other sustainability goals will require a significant scaling up of investment, including from private sources of finance.

The good news is there is no shortage of available capital globally. Institutional investors in OECD and G20 countries alone have at least US$64 trillion of assets under management—and under the current investment regulations in OECD and G20 countries, pension funds and insurance companies can allocate up to US$11.4 trillion towards infrastructure.[b,13] Environmental, social and governance (ESG) investing and broader sustainable finance have also rapidly increased in the past few years.[14] Positive developments include the initiatives such as the Financial Stability Board's industry-led Task Force on Climate-related Financial Disclosures (TCFD), the development of sustainable finance taxonomies and definitions in Asia and elsewhere to guide financial decisions, and the growth in green bonds issuance.[15] Since the first issuance of green bonds by Yes Bank in 2015, India has emerged as the second-largest emerging green bonds market, with US$7.2 billion in issuance, most of which has been used to fund renewable energy projects.[16] Yet, issuance so far remains too small to meet the country's green finance needs.

b In investable assets under management (AUM)

Unfortunately, the world is still a long way from aligning financial flows with the Paris climate objectives. The lion's share of financing is not yet sustainable, even though making infrastructure climate-compatible will require only a 10 percent incremental increase in expenditure over known levels.[17] A new OECD empirical study of institutional infrastructure investment shows that institutional investors hold only US$314 billion in green infrastructure, out of US$1.04 trillion in infrastructure assets.[c,18] As for international climate finance flows, OECD analysis highlights that donor countries need to urgently step-up efforts to provide public climate finance and improve its effectiveness in mobilising private finance.[19] These efforts must further support developing countries to respond to the immediate effects of the pandemic and to integrate climate actions into each country's recovery from the COVID-19 crisis to drive sustainable, resilient and inclusive economic growth.

Countries are also far from addressing the global loss of biodiversity and ecosystem services, which are being destroyed at an unprecedented and accelerating rate, with 25 percent of all plant and animal species now threatened with extinction. Protecting biodiversity is also vital to avoid the next pandemic.[20] COVID-19 is a zoonotic disease, as are nearly two-thirds of infectious diseases.[21] The pandemic has underscored the importance of environmental health and resilience as a critical complement to public health.[22] Yet, investors' and businesses' awareness of and commitment to biodiversity action remain too limited. This is despite a few encouraging initiatives to build momentum in the lead-up to fifteenth meeting of the Conference of the Parties to the Convention on Biological Diversity, such as the future Task Force on Nature-related Financial Disclosures.[23]

If sustainable finance is to be environmentally sustainable, it must assess and manage its impact on the environment instead of only considering the financial risks posed by environmental factors. In the lead up to COP26, the shift towards a financial system that fully considers its own climate (and biodiversity) impacts on people and the planet must be accelerated. There needs to be improved assessment, management and disclosure of corporates' and financial actors' adverse climate (and biodiversity) impacts and risks on society and the planet, from an *environmental materiality* perspective.[d] More broadly, much more work is needed to align the entire financial

c Excluding corporate stocks, even of infrastructure-related corporations

d i.e., material adverse impacts and risks on people, the environment and society, resulting from investment and business decisions.

system with environmental and social goals, as stressed in ongoing OECD work with the United Nations Development Programme and other key actors on SDG-aligned finance.[24]

Creating Real Impact

Good progress has been made worldwide on disclosing the risks that climate change poses for financial returns, i.e. from a *financial materiality* perspective.[e] An increasing number of central banks, financial supervisors, and individual investors, insurers and financial institutions are trying to better understand and emphasise the economic and financial impact of climate-related financial risks (particularly *physical* and *transition* risks[25]), and to develop climate scenario analysis and stress tests to better assess and manage these risks. This is partly thanks to momentum amongst financial regulators generated by the Network of Central Banks and Supervisors for Greening the Financial System, in which the OECD is an observer, as well as a transition in thinking amongst investors based on the implementation of TCFD recommendations.

Yet, making finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development, as called for under Article 2.1c of the Paris Agreement,[26] requires that policymakers, standard setters, investors and finance providers pay far greater attention to the climate impacts of finance in the real economy, society and the planet.[27] Of course, governments need to set the right incentives in the real economy to redirect finance away from emissions-intensive projects, and provide policy frameworks consistent with a transformational—not incremental—approach to decarbonising the economy.[28] It is important to note here that policy interventions, incentives and, more broadly, low-emissions resilient transition trajectories will depend on countries' national circumstances and priorities. Variability between regions and individual economies is desirable to ensure broad consensus and the successful delivery of global commitments. But beyond the need for tailored policies in the real economy, given the systemic nature of climate change and other environmental goals, changes are needed in how the global financial system works to deliver the financing needed to transition to a green economy and sustainable development.[29]

e i.e., the material risks to financial performance and broader financial stability resulting from climate change.

Inter-related concepts of environmental materiality, alignment and impact

Financial materiality addresses environmental factors where such factors may have an impact on the financial performance of a company or on the broader financial stability of the financial system. Taking an "outside-in" perspective, financial materiality considers the (internal) impacts that environmental (and social) factors may have on a company's financial performance. In contrast, the concept of environmental (and social) materiality takes an "inside-out" perspective. It focuses on the adverse (external) impact of a corporate or investment decision on society and the environment, in terms of environmental (and social) factors. For an increasing number of investors and other stakeholders, managing climate risks and adverse impacts on society and the planet requires assessing the misalignment of portfolios with climate goals, and aligning portfolios with such goals.

Beyond the notion of impact, the word materiality also implies a degree of relevance, level or sufficiency. In the financial materiality context, an investor considers whether a particular risk factor has a sufficiently "material" impact on financial performance to warrant assessment and disclosure. In the context of corporate and investor disclosure, the environmental materiality concept encompasses the relevance and sufficiency of corporate and investor actions to reduce negative environmental impacts and risks in light of broader environmental goals. In the context of sustainable finance standards, taxonomies and definitions (as well as the emerging area of transition finance), environmental materiality encompasses whether investments are sufficiently aligned with key environmental objectives to merit or qualify for the use of a particular label. For example, the EU requires that only those green bonds (issued or sold in the EU) that finance economic activities aligned with the EU Sustainable Finance Taxonomy, are sufficiently green to receive the EU green bond label. The Taxonomy criteria are aligned with the EU's goal of climate neutrality by 2050, which in turn can be understood to encompass a regional pathway and underlying national and sectoral pathways. Thus, judgements on what is sufficiently green—or what might be sufficiently stringent to qualify for a future "transition finance" label, for example—are multi-faceted and complex to assess.

Sources: Dobrinevski, A. and R. Jachnik (2020); European Commission (2021); European Union (2020); European Commission (2019); IMP (2020).[34]

The financial market must pay increased attention to the choice of metrics used across asset classes and investment mandates from the standpoint of *environmental materiality*. Whether in setting climate disclosure standards, ESG indices or benchmarks, or green bond standards, environmental impact is central to achieve sufficient emission reductions and climate resilience in the coming decade. The latest proposal by India's Securities and Exchange Board on mandatory business responsibility and sustainability reporting is an appreciable step towards better assessing the environmental materiality of financial decisions.[30]

Ensuring the financial system addresses its adverse climate and other environmental impacts will also help focus attention on issues of greenwashing in sustainable finance. For example, although green bonds continue to be a focal point for green finance, a 2020 study by the Bank for International Settlements indicates that "green bond projects have not necessarily translated into comparatively low or falling carbon emissions at the firm level."[31] Similarly, while ESG investing assets now account for trillions of dollars[32] and have increased during the ongoing COVID-19 crisis, its climate benefits are unclear at best. For example, a 2020 OECD report found that several highly rated ESG portfolios actually have higher total CO_2 emissions and carbon intensity than traditional market weighted portfolios.[33]

Of course, climate change is not the only environmental challenge for which significantly increased scrutiny on the environmental impacts of finance is urgently needed. Biodiversity loss and water-related challenges are existential challenges for humanity, and yet the environmental impacts of finance are only beginning to be explored in detail, particularly for biodiversity. So far, the biodiversity finance agenda has largely been driven by the public sector,[f,35] for instance, with India's National Biodiversity Finance Plan launched in 2019.[36] Yet, scaling up private finance in support of biodiversity action will be critical to achieve biodiversity goals. And investors, issuers and corporates need to better integrate biodiversity factors (including risks, impacts, dependencies and opportunities) in their decisions.[37]

f Based on currently available data, global biodiversity finance is estimated at US$78-US$91 billion per year (2015-2017 average), including US$67.8 billion per year in public domestic expenditure, US$3.9-US$9.3 billion per year in international public expenditure, and only US$6.6-US$13.6 billion per year in private expenditure on biodiversity

In addition, strong growth in ESG investing and broader sustainable finance have encouraged a proliferation of disclosure frameworks, metrics, rating methodologies and investment approaches, which creates further challenges to ensure that sustainable finance delivers on environmental materiality and impact.[38] Currently, ESG practices vary so widely that they lack clear alignment not only with financial materiality (and there is little evidence that risk adjusted returns have kept pace over the past decade) but also with societal and environmental objectives.[39] Indeed, as sustainable finance has begun to merge with mainstream finance, fragmentation, a lack of transparency or the risk of greenwashing can be seen in various areas. These include sustainable finance definitions, ESG methodologies and metrics, sustainability and integrated reporting metrics, sustainable infrastructure standards, and the emerging area of climate transition finance. Importantly, steps to harmonise financial and sustainability reporting have only just begun, and while there is a wealth of ESG data available, it is not consistent, comparable or easily verifiable. Policymakers must step up to make sustainable finance practices fit for purpose by working together towards a global, mandated, auditable sustainability reporting framework, including to drive better transparency and standardisation of the core elements of environmentally (and socially) sustainable disclosure. Policymakers can also strengthen the regulatory environment, including regulatory guidance on data disclosure and appropriate labelling of sustainable finance products to ensure their link to the double materiality is clear, in addition to defining long-term financial materiality to better capture slower-moving environmental and social risks.

There is already an international legal instrument to help businesses, investors and other financial actors undertake and report on environmental and social due diligence, namely the OECD Guidelines for Multinational Enterprises (the Guidelines).[40] The Guidelines, and related due diligence guidance[g] for corporates and investors, focus primarily on social and environmental materiality. The Guidelines are the only multilaterally-agreed and comprehensive code of Responsible Business Conduct (RBC) that governments have committed to promoting, representing international consensus on the responsibility of businesses regarding impacts on society and the environment. The Guidelines are adopted by all OECD members and 12 non-member

g Including the OECD Due Diligence Guidance for Responsible Business Conduct; the OECD report Responsible Business Conduct for Institutional Investors, and forthcoming supplement to this report to analyse what the OECD Guidelines and the Due Diligence Guidance means for institutional investors in terms of climate risks to society and the environment.

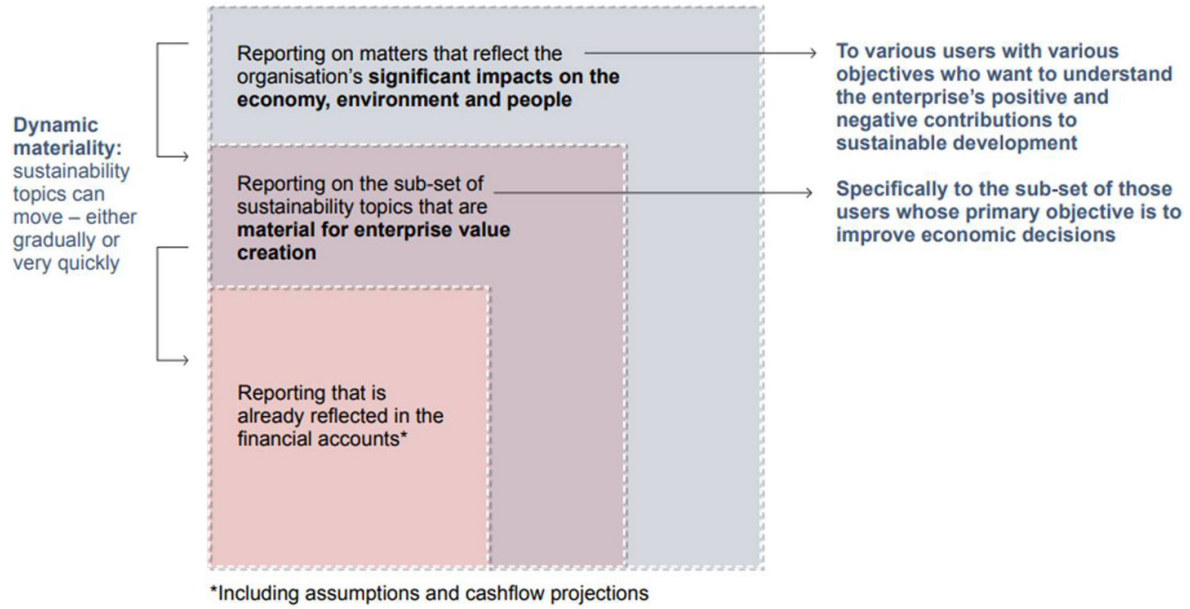
countries,[41] and are open for adherence to interested non-OECD members. These countries represent some of the largest markets in the world and a large majority of global trade and investment activity. Climate, biodiversity and other environmental considerations explicitly fall under the scope of the Guidelines, but no practical guidance has been developed yet to support the implementation of RBC and due diligence for climate change or biodiversity specifically.

In addition, environmental materiality and due diligence are gaining traction as an important complementary lens through which to consider sustainability factors, although it is important to recognise that national circumstances may differ worldwide. The EU's Non-Financial Reporting Directive, for instance, has a double materiality approach, and the EU's disclosure obligations under the Sustainable Finance Taxonomy regulation are introducing a focus on the environmental impact of economic activities, which may impact Indian companies seeking to attract EU-based investment. India is part of the EU International Platform for Sustainable Finance to advance environmentally sustainable finance, along with 16 other members accounting for 55 percent of greenhouse gas emissions, 50 percent of the world population, and 55 percent of global GDP. In Asia, examples of recent environmental due diligence regulations include Japan's guide for environmental due diligence along value chains.[42] Worldwide, five framework- and standard-setting institutions[h] have published a shared vision of the elements necessary for more comprehensive corporate reporting that consider environmental material factors as part of a "dynamic materiality" approach (see Figure 1). The IFRS Foundation's 2020 consultation paper on sustainability reporting suggests that a new Sustainability Standards Board could consider how to extend its scope beyond financial materiality in light of evolving stakeholder views. The OECD stressed the importance of considering double materiality in its response to the IFRS Foundation Consultation on Sustainability Reporting, along with the need for greater coordination to standardise sustainability disclosure practices.[i,43] Several investors, issuers and other financial institutions have stressed a similar message to the IFRS Foundation.[44]

h The CDP, the Climate Disclosure Standards Board, the Global Reporting Initiative, the International Integrated Reporting Council and the Sustainability Accounting Standards Board.

i The OECD's response to the consultation states that, "the OECD supports efforts by the SSB [Sustainability Standards Board] to consider how to broaden its scope as it proceeds with its work, while working with other initiatives, to provide a more comprehensive assessment of the risks and opportunities for a reporting entity."

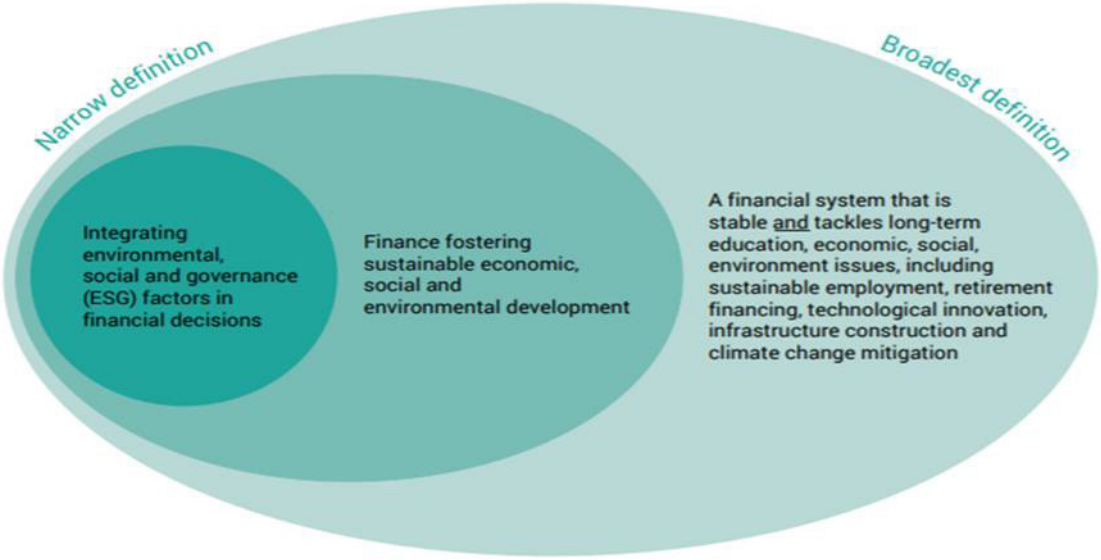
Figure 1. Dynamic materiality



Sources: CDP et al. (2020); WEF (2020).[45]

The Paris Agreement has also stimulated a wide range of activities on how finance might be better aligned with climate goals. For several years, the OECD-led Research Collaborative on Tracking Finance for Climate Action has been producing analyses and organising workshops that contribute to increasing the knowledge base on climate finance and climate alignment of investments and financing.[46] An increasing number of stakeholders are recognising the need to align portfolios with climate goals to manage climate risks and adverse impacts on society and the planet, from an environmental materiality perspective. Though country contexts differ, several financial stakeholders are also increasingly recognising the need to go beyond a pure financial stability, financial materiality or pure risk management approach, towards a precautionary, market-shaping approach in support of broader climate alignment goals. In August 2020, the Institutional Investors Group on Climate Change, for instance, launched a Net Zero Investment Framework for consultation, as part of the Paris Aligned Investment Initiative, to explore how investors can align their portfolios with the goals of the Paris Agreement.[47] And as part of the COP26 private finance strategy, environmental materiality issues are being discussed in the guise of ongoing work on portfolio alignment with climate objectives.

Figure 2. Three definitions of sustainable finance



Source: EU HLEG (2017).[48]

The next few years will be critical to ensure the financial system is fit for purpose to deliver the financing needed to achieve environmental and other SDGs. Beyond a narrow definition of sustainable finance as merely integrating ESG factors in financial decisions, the broadest definition of sustainable finance is "a financial system that is stable and tackles long term education, economic, social, environment issues" (see Figure 2). In the past decade, the OECD has worked to mobilise private finance for sustainable investment, including through analytical work and engagement under its Centre on Green Finance and Investment[49] and its annual flagship event, the OECD Forum on Green Finance and Investment, which took place virtually in October 2020, with 3800 registered participants, including 500 from 23 Asian countries. As its contribution to this global effort, the OECD plans to initiate analytical work on the climate and environmental materiality, alignment and impact of finance. Foreseen research and analytical work include projects on the environmental materiality of metrics used in financial and non-financial disclosures; climate alignment assessments of finance; emerging approaches to climate transition finance;[50] and environmental and climate due diligence process and risk management tools, building on the OECD Guidelines for Multinational Enterprises.

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11

Unlocking Capital for Climate Response in The Emerging World

Kanika Chawla

As countries worldwide recover from the shock of the ongoing COVID-19 pandemic, focusing on sustainability and clean energy investment offers a huge opportunity to stimulate economic activity, provide reliable clean energy, employment, and put global emissions into structural decline. With several competing priorities and development progress in free-fall in many parts of the world, it is not surprising that several countries are looking to address more pressing concerns and putting their climate and sustainability efforts on hold. However, evidence suggests that this will be a huge mistake.

The COVID-19 pandemic has exposed the severe vulnerabilities and structural inequalities resulting from chronic underinvestment in energy access in developing countries. Health facilities are under-energised and so unable to deal with the increasing number of patients from the pandemic, while critical equipment and the handling and distribution of vaccines is hampered by the lack of access to secure and reliable energy. This has brought to the fore the key role of energy supply in advancing development priorities, which, when seen through the prism of global energy investments, makes the economic case for clean energy. While COVID-19 has adversely impacted all market segments of the energy sector, clean energy spending was relatively resilient as compared to fossil fuel investment, contributing a third of global energy investments in 2020.[1] However, the US$600 billion invested in clean energy and energy efficiency is far short of the US$1.1 trillion required annually till 2030 to reach the world's climate and sustainable development goals,[2] predominantly flowing into the developing world.

While the global economic downturn may not suggest this to be a favourable time, seizing the opportunity of fiscal responses can support the investment needed to meet access and sustainable energy goals. Recognising the opportunity to pivot towards enhanced sustainability through public infrastructure spending such that economies prepare themselves for the future, an increasing number of geographies are allocating an important share of their recovery packages to support energy efficiency and renewable investment. One of the most important co-benefits of the enhanced adoption of renewable energy and energy efficiency is job creation. Investments in clean energy create three-and-a-half times the number of jobs as an investment of the same size in fossil fuels.[3]

To Respond to Climate, Act on Energy

There is global consensus that extreme weather and disruptions—such as drought, flooding and conflicts over natural resources—excessively affect the developing world, particularly the poor and most vulnerable. Air pollution kills more Africans than childhood malnutrition or contaminated water.[4] World Health Organization data shows that of the annual 2.2 million environment-related deaths on the African continent, 600,000 are linked to outdoor air pollution.[5] Further, in 2019, African countries were estimated to be spending between 2 percent and 9 percent of GDP in responding to climate events and environmental degradation.[6] Thus, the need for action is both urgent and important. However, it is important to note that climate-linked outcomes are a manifestation of energy actions. Energy use for electricity, industry, transportation and buildings, among others, accounts for 76 percent of global greenhouse gas emissions.[7] Thus climate action is deeply interlinked with action on energy, which in turn has strong interlinkages with development and economic growth prerogatives.

To get on track for net-zero emissions by 2050, the amount of investment required in clean electricity (generation and grid/storage infrastructure) will need to rise to over US$1.6 trillion per year by 2030.[8] This is over four times more than what was invested in these sectors in 2020.[9] According to estimates by the United Nations Economic Commission for Africa, in regions like Africa, installed electricity capacity will need to double from its present value of 250 GW by 2030 and increase at least five-fold by 2050.[10] There is, therefore, an urgent need to shift gear in terms of enabling the flow of investments required to meet the targets of Sustainable Development Goal (SDG) 7 (ensure access to affordable, reliable, sustainable and modern energy for all), support attainment of the other SDGs, and enable a just transition to the global energy transformation that puts the world on track for carbon neutrality by 2050. Till these investments are not mobilised at the scale, and affordable price required, the common goals of sustainability and limiting climate change will remain out of reach.

Mobilising Capital for a Just, Inclusive and Equitable Energy Transition

Despite compelling drivers to transition to clean energy and energy efficiency, financial flows to these sectors in developing countries remain woefully small due

to a litany of real and perceived risks. The quantum of finance required to accelerate the green transition is a small share of the global capital available. Institutional investors hold US$100 trillion globally in securities, real property assets, insurance, pension funds and sovereign wealth funds.[11] This low-risk, long-tenured institutional capital must be mobilised, especially as environmental, social and governance (ESG) considerations take centre stage. However, low-carbon energy investments tend to have high upfront capital intensity, making financing costs an important affordability component. Providers of debt and equity capital price project risks into their cost of financing, including market and regulatory uncertainty, following a risk/reward dynamic. Higher risks thus increase costs but may also curb investment appetite, resulting in lower capital availability. The policy challenge is how to address perceived risk assessments and what actions to take to lower real risks to improve the attractiveness of investment opportunities across the immense green transition landscape in developing countries.

There is a need to rapidly increase the number of projects available through an improved enabling environment for clean energy investments and more projects being brought to market to meet the sustainable energy goals and targets. A market that is considered small has lower investor interest. A market that is perceived as difficult is also one that has low investor confidence. However, even as the world sees an increasing share of investments going towards renewable energy in developing markets, this investment is highly concentrated in a few markets and technologies. There is a need to improve and increase the availability of capital to fill clean energy and infrastructure gaps across the globe. This should be based on improved complementarity and coordination between public and private finance, and a shared vision among different financial institutions, including international financial institutions, local banks and institutional investors. While the rise of ESG-linked financial instruments, such as green bonds, is creating more liquidity seeking clean energy investments in an already liquid environment, the risk appetite of market participants is often more limited. The cost and availability of finance are closely related to the enabling environment for new clean energy projects.

Attracting private financing depends on the energy policy frameworks, including infrastructure planning, fiscal incentives, and market and regulatory issues. Development finance institutions and international financial institutions can play a critical role in bridging some risk gaps and addressing market failures. Public banks need to step up their role as catalysts for investment, for instance, through blended finance and market-making subordinate roles in riskier projects.

While institutional capital brings the promise of immense scale and can be mobilised under the right circumstances, multilateral guarantee mechanisms could contribute to the credit enhancement required to make institutional capital more comfortable in newer clean energy markets. Designed to lower the counterparty for investors, not only local political risk but also the credit risk associated with offtake agreements, risk guarantee mechanisms could unlock the quantum of capital required to drive the transition at scale. For instance, to access the Indian bond market, a credit enhancement mechanism of US$649 million over five years can facilitate a 16x leverage and help double ground-mounted solar installations from 31.6 GW to 63.5 GW.[12]

Investment Decision-Making Should Respond to Climate Risk

Even as much greater effort and innovation is required in accessing affordable capital at scale for clean energy markets, hindered by risks, investment decision-making largely continues to ignore another set of risks—climate risk. The ongoing pandemic has played an important role in raising awareness about previously unmapped existential threats and their adverse impact on the financial sector at large. Climate change poses one such imminent existential threat, the effect of which will be far greater than anything witnessed before. Evidence from stress tests conducted by some central banks clearly signal the enormity of the risk and the lack of preparedness to cope with it.[13,14]

Climate-related risks are usually divided into two categories—physical risk, which is the economic impact stemming from the expected increase in the frequency and magnitude of natural hazards; and transition risk, which is the financial risk on investments associated with the adverse impact of policies or regulation that advance the transition to a low carbon economy. Currently, across geographies, several green ratings and risk measures exist parallel to the central credit rating mechanisms. Therein lies the flaw; to suggest that climate risk is separate to the overall credit risk would be myopic. One estimate suggests that if temperatures rise to 4°C above preindustrial levels over the next 80 years, global economic losses could amount to US$23 trillion per year.[15]

Beyond the physical risks, the financial system could be destabilised as an increasing number of carbon-intensive investments become stranded or commercially unviable

as policies and regulations move towards more sustainable standards. This risk acts as a double-edged sword. On the one hand, the imminent shift towards greener policies and regulations is necessary to redirect capital towards clean energy projects and away from those that exacerbate the physical risk of climate change. On the other, the opportunity cost of the improved policies and regulations is the transition risk that is likely to manifest in stranded assets for investors. One estimate puts the present value of potential losses at US$18 trillion.[16]

Integrating climate risk into investment decision-making needs capacity building and new tools to evaluate risk exposures. Strong financial regulation could play a critical role in mainstreaming the integration of climate risk into decision-making. Global efforts are underway through the Taskforce on Climate-related Financial Disclosure and the Network of Central Banks and Supervisors for Greening the Financial System. However, much more is needed to expand the footprint of these efforts such that their recommendations begin to impact large volumes of global transactions.

Balancing Common Goals of Ending Energy Poverty and Advancing Clean Energy

Energy poverty, not unlike economic poverty, has wide-ranging impacts, including on livelihoods, health, education and economic value creation. Nearly 90 percent of energy investment in 2018 was concentrated in high- and upper-middle-income countries and regions.[17] With just over 15 percent of the global population, high-income countries accounted for more than 40 percent of energy investment in 2018. In studied contrast, lower-middle and low-income countries accounted for less than 15 percent of energy investment, despite housing well over 40 percent of the world's population.[18] An inclusive, equitable and just energy transition must urgently address this mismatch.

Financial markets are getting greener and increasingly reward ambitious transition policies. As a result, financing is expected to become increasingly available for clean energy projects, translating to lower financing costs. This trend is accelerating across the financial sector, but not at the pace or scale required. New rules on corporate disclosure and emerging sustainability commitments by these actors can significantly bolster capital allocation towards clean energy. The market for sustainable debt, including green bonds is growing rapidly. Governments and companies are expected

to issue US$ 500 billion of green bonds in 2021 alone, an increase of 50 percent of the stock of green bonds.[19] Investment funds and equity investors are taking climate risk increasingly seriously. Transition risk is priced in for carbon-intensive projects and companies. Many asset managers are in the process of reducing their exposure to or divesting entirely from, energy activities and companies involved in coal, oil and gas.

Given the long-term commitment to net-zero emissions by 2050, there is a growing trend among development finance institutions to withdraw from fossil fuel investment, including the World Bank's decision to cease funding for upstream oil and gas development[20,21] and the new restrictions on financing downstream gas development currently being considered by the European Union, the UK and the US. While well-intentioned, this move does not consider the principles of common but differentiated responsibility and leaving no one behind that are enshrined into global treaties around sustainable development and climate action. Such a move also disregards the importance of gas as a means to urgently address energy poverty in a technologically and economically viable manner.

There are currently over six billion energy consumers in the developing world whose demand is projected to grow another 30 percent over the next 15 years, up from 7000 million tonnes of oil equivalent (Mtoe) in 2015 to 9100 Mtoe in 2030.[22] This will be powered in large part by rapidly expanding economies, specifically industrial growth and rising standards of living. The energy investment available to developing countries will determine the pace of their economic and energy transition. Limiting the availability of capital through direct regulations on capital flows to gas, or indirectly by signalling to private sector and removing support mechanisms funded by development finance initiatives, thwarts the right of developing countries to progress on low carbon development pathways. Although gas is a fossil fuel that contributes to greenhouse gas emissions, increasing its use in power generation allows several developing countries to phase out more polluting fuels such as coal, diesel and heavy fuel oil, while integrating more renewables into its energy mix—using gas as a balancing fuel. Further, the role of gas for cooking cannot be emphasised enough. LPG-based policies and schemes are critical to realising universal access to clean cooking by 2030, giving 2.8 billion access to clean cooking solutions for the first time, and will need global investment of US$4.4 billion annually till 2030.[23]

The policy decision to decarbonise capital flows are important in driving the necessary shift towards a more sustainable and resilient global order, but the shift must be

nuanced and responsive to on-ground political realities, and target economies and sectors that have the most work to do to decarbonise. Public finance, including multilateral development banks and national development banks, has an important role in financing the energy sector to address energy poverty and advance the energy transition. They must balance the SDG-7 targets with the net-zero emissions target of 2050, and provide low cost and long term financing that is not otherwise available and can crowd-in private financing to advance clean energy. This, in some cases, may need the support of transitionary fuels. Overall, the move to sustainable energy must leave no one behind, including through the transfer of employment opportunities from one sector to another to avoid creating a divide between those who do and those who do not benefit from the energy transition. It is not enough to merely scale up investments, but it must be ensured that they are flowing into countries, sectors and programmes that reach the poor(est) and most vulnerable, while also addressing the social consequences and distributive effects of the transformation of energy systems to ensure a just energy transition.

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12

Putting Women Front and Centre of India's Green Recovery Process

Shloka Nath, Isha Chawla and Shailja Mehta

In 1810, German poet, artist and politician Johann Wolfgang von Goethe published *Theory of Colours*, his treatise on the nature, function and psychology of colours.[1] An absorbing account, it is his description of the colour green that bridges the intuitive and visceral in a way that more than 200 years later still holds lessons for us. Green, he says, is the result of uniting the most fundamental and simple colours, yellow and blue. "Mixed in perfect equality so that neither predominates." In the same vein, recovery from the economic shocks of the COVID-19 pandemic and avoiding severe future blows triggered by the climate crisis are not conflicting interests, but a mutually reinforcing coping strategy. Governments are pledging to rebuild again, to create jobs, spark growth and repair the damage done. But what will the rebuilt economy look like?

In a warming world, resilience and sustainability must serve as the cornerstone for long-term development. This mandates a new paradigm that de-links economic growth from greenhouse gas emissions.[2] A green recovery focuses on policies and solutions that will benefit people and the planet in the years ahead. Safeguarding the environment by protecting ecosystems and fighting the climate crisis is a key part of green recovery, as is investing in clean-energy jobs, securing public health, safety and civil rights, and prioritising climate justice. In this way, a green recovery seeks to build a new socio-economic model that is climate neutral, resilient, sustainable and inclusive.

While the case for building a more sustainable development pathway is strong, the Indian economy is facing an existential crisis—teetering between a 'business as usual' approach and the transition to a green economy. India ranks negatively on the Greenness of Stimulus Index, due to a significant proportion of its stimulus going towards fossil fuels and environmentally intensive industries, but India has also been investing in green technologies, especially solar and battery storage.[3] By aligning economic recovery measures with the Sustainable Development Goals and Nationally Determined Contributions (NDCs), the poor and vulnerable—at the greatest risk from the deprioritisation of climate and ecological impacts—can be protected.[4] The post-COVID-19 period is an opportunity for India to promote sustainable agriculture and sustainable public procurement; resource efficiency and circularity across sectors and supply chains; and green jobs and green local enterprises. India could also link recovery efforts with the clean energy transition, nature-based solutions and its NDCs,

such as through e-mobility or promoting off-grid renewable energy for applications like agricultural and vaccine cold-storages.

While crucial, these solutions are incomplete if not accompanied by the equally important imperative to be more inclusive in their approach. One way is to involve and safeguard more women in the post-COVID-19 world. The majority of crises hit the most vulnerable and marginalised populations—among which women are disproportionally represented—the hardest. The impact of the COVID-19 pandemic on women, especially those facing multiple forms of discrimination related to poverty, caste or disability, has been stark. Illustrated by a sharp decline in women's participation in the labour force and education[5], this inequality will only be exacerbated by climate change. At the same time, women serve as important levers of change that can stimulate the economy and develop climate resilience. Therefore, even though green jobs and the promotion of the green economy are pivotal for achieving economic and social development that is also environmentally sustainable, it cannot happen without gender equality, a vital component in the world of work to advance the greening of economies.[6]

Agriculture

The COVID-19 pandemic and subsequent lockdown revealed the staggering number of migrant workers, mostly male, that cross both state and rural-urban borders for employment.[7] Left in the wake of their city-lured aspirations are the women who take over the duties of the farm, leading to a widespread feminisation of Indian agriculture. The 2011 Census found that 65 percent of the total female workers in India were employed in agriculture, forming 30 percent of cultivators and 43 percent of agricultural labourers nationally.[8] In most cases, these women do not hold land titles in their name, excluding them from availing of a plethora of government schemes that mandate land ownership. Lacking access to robust education and financial literacy, these women are often not viewed as the primary decision-makers of the household.

Agriculture and climate change are inextricably linked—about 60 percent of farmland in South Asia is rainfed, leaving millions vulnerable to the effects of a shifting monsoon.[9] Crop failures can push rural communities into severe poverty, and are compounded by small landholding sizes and poor market linkages.[10] With many women engaged in agriculture but lacking access to adequate technology, training

and credit, two distinct phenomena occur concurrently. First, a large percentage of farmers and farmworkers are being excluded from the sharing of best practices. Second, a warming world is exacerbating the burden that will be faced increasingly by female farmers and farmworkers, who in many cases lack agency and the means to adapt.

Increasing women's land titles and creating supportive legislation are promising steps, but are often mired in the complexity of implementation. Deeply entrenched gender norms, upheld by men and women alike, complicate seemingly straightforward interventions. In addition to being difficult to execute, increasing women's land ownership may not solve problems of women's access to literacy or decision-making status in the household. Instead, interventions that aim to demonstrate women as an economic asset, who can generate income for their families through improved agricultural outputs, tend to be more holistic.[11] These interventions can enhance the position of women as leaders and decision-makers, building the long-term gender equity of the region.

Using women as a lever to develop climate-resilient sustainable agriculture can be best leveraged through existing socio-professional support networks. Self-help groups (SHGs) and state rural livelihood missions (RLMs)—women's community organisations that offer aid and services related to agriculture, cottage industries and microcredit—exist across the country and are funded by state governments in many cases. The development sector has worked extensively in the training and capacity building of these organisations to help increase women's digital and financial literacy and market access, opportunities to access microfinance and loans without land collateral, and knowledge sharing of best practices to increase the quality or yield of agricultural output.[12] These groups can also assist women in dealing with complex bureaucratic government machinery. For instance, research on gender disparities among cotton cultivators in Maharashtra found that 85 percent of women surveyed had never accessed government schemes, primarily due to a lack of knowledge.[13]

In light of a green stimulus, SHGs and RLMs can be activated as vehicles for the widespread adoption of sustainable agricultural practices. Increased agroforestry, mixed cropping, improved irrigation methods, reduced fertiliser use, and integrated pest management can help diversify farmer livelihoods and simultaneously build healthy farm ecosystems that can withstand climate shocks. Swayam Shikshan Prayog (SSP), a women's community organisation, worked extensively in the Marathwada

region of Maharashtra to enable a "women-led climate resilient farming model" after severe drought caused a mass migration of men to cities.[14] In four years, SSP empowered women through training in key resilience practices, access to a low-interest fund, and community-level knowledge sharing. This led to a 25 percent increase in crop yield due to diversification practices, 25 percent savings per crop per cycle on input costs, improved local water sources and increased household savings.[15]

Both social and economic measures are necessary in bringing about this change. Increasing the number of financial instruments available to women farmers that do not require land collateral and place emphasis on climate resilience are pivotal to bringing about ground-level change. In addition, interventions must be sensitive to women's limited time capacity, given their existing responsibilities on the field and in managing the household, to ensure their ability to participate. Furthermore, sensitisation workshops for the community should also work with men to demonstrate women's value as income providers, decision-makers and agents of change.[16]

Green Jobs

India has one of the lowest female labour force participation rates globally—just shades above Syria, Iran, and the West Bank and Gaza, among a few others.[17] Some researchers estimate that 95 percent of India's female workforce is engaged in the informal economy, due to high levels of unpaid housework and lagging female education.[18] The pandemic has exacerbated this crisis, with female labour force participation dropping to 11 percent (while males participation is 71 percent), and fewer women than men have recovered the jobs lost during the lockdown.[19] In this context, it is clear that women are an underutilised economic resource, and that growth and recovery will be limited in the absence of gender-focused interventions.

As new economies unfurl from nascent green transitions, several natural opportunities emerge to tap into this underutilised resource. These opportunities can be divided into two broad categories—increasing women's participation in green industries and using green technology to enhance existing women-led micro-enterprises. The former spans across geographies and skillsets but is centred around renewable energy management and proliferation. The latter is more specific to rural women, many of whom are already engaged in some cottage industry or agricultural work that can be strengthened by renewable energy access. Both categories make recommendations

based on organic linkages between existing demographic trends and the industries of the future.

Solar energy, a favourite of the Indian government, has been growing rapidly, in line with India's international climate and renewable energy targets. However, rooftop solar solutions, despite representing a major opportunity, has been slow on the uptake. According to a study conducted by the International Energy Agency and the Council on Energy, Environment and Water (CEEW), it is the most labour-intensive of prevailing renewable technologies—creating seven to 20 times more jobs than utility solar or onshore wind.[20] Furthermore, about two-thirds of jobs in the rooftop solar sector require high- or mid-level skills, especially in the realm of engineering. Over 30 percent of students studying engineering in India are female, one of the highest rates in the world, yet they are largely absent from many core business segments—and the upper echelons—of corporate rooftop solar.[21] This can be traced back to a plethora of reasons, including concerns about safety at project sites, misperceptions of women's capabilities in certain (popularly imagined as masculine) roles, and insufficient HR policies or gender-sensitive workplace practices. Both government and corporate organisations can be used as tools to further gender inclusivity in the rooftop solar sector, unlocking a new segment of highly-educated and capable employees.

Unskilled workers also have a critical role to play in the adoption of green and sustainable technologies. Frontier Markets, a last-mile distribution company that aims to expand rural access through the digital marketplace, uses women as a lever to increase community uptake of clean energy products. These women, known as "solar *sahelis*" (solar friends), work closely with villagers to overcome the scepticism towards these products, such as solar-powered flashlights, which often have higher upfront costs than their battery-powered counterparts.[22] These women are instrumental in expanding the reach of frontier markets and, in turn, are empowered by both their economic returns and their subsequent decision-making leverage in society. Similarly, in urban and peri-urban settings, Mahila Housing Trust (MHT) activates women community action-group-members to work with slum communities across various climate-resilience issues. These interventions range from conducting energy audits and increasing the adoption of energy-efficient devices[23] to painting rooftops white and building embankments to protect against the furies of summer and monsoon.[24] MHT's model is built on the governing principle that improving women's habitats affords them a "key financial asset that supports livelihoods, and makes the poor more resilient to heat stress, disease, and other hazards of climate change."[25]

Many women in rural India both own and work at micro-enterprises and are often responsible for non-mechanised labour, which is extremely time-intensive. Furthermore, a study by CEEW found that erratic and poor-quality grid electric supply is a considerable bottleneck for several micro-enterprises across the country; this often leads to a loss of productivity and rampant use of kerosene or diesel.[26] Introducing machinery powered by distributed renewable energy (DRE)— from cold storage and food processors to sewing machines and looms—can provide a stable electric supply, thereby improving rural incomes, reducing time poverty and drudgery, and empowering local women. However, DRE equipment has a higher upfront cost than kerosene- and diesel-powered machinery.[27] Increased investments in this sector, through philanthropic funding, government subsidies or financial instruments, can increase women's access to a stable and clean energy future.

Healthcare

India spends only 1.3 percent of its GDP on public health care,[28] among the lowest in the world. Within this limited spending, access to health services—especially among vulnerable populations—is not universal. A study conducted in four major northern Indian states revealed that gender discrimination in healthcare access was worse for female patients in the age groups of 0-18 years and above 60 years and female patients who lived at increasing distances from a hospital.[29] Another study posits that the average healthcare expenditure is lower among women than men, despite women suffering from a higher incidence of morbidity.[30] The challenge also is that such gender-based health studies are limited in number; gender discrimination in access to health has not been systematically studied in India and many other developing countries, primarily due to a lack of reliable data.

Increasingly destructive climate impacts magnify the situation of weak healthcare systems in India. Rising temperatures are predicted to increase the transmission of vector-borne diseases across temporal and geographic scales.[31] Moreover, climate change is projected to cause an increase in the occurrence and intensity of extreme weather events, such as droughts, cyclones and heavy rainfall in India.[32] Evidence suggests that there is a higher probability of disease outbreaks with the increase in extreme weather events.[33] Furthermore, women's health is disproportionately affected by climate impacts, such as air pollution, heat events, and water-borne and nutrition-related diseases, due to gendered household norms and limited access to

knowledge and services.[34] This means that India's health sector will have to transform tremendously to deal with climate impacts, in addition to the existing burden of providing health services to all its people, particularly women.

India's Accredited Social Health Assistant (ASHA) programme is likely the world's largest army of all-female community health workers,[35] forming the backbone of the country's health system. But ASHA workers are overburdened and underpaid—they are hired as volunteers and are paid on an incentive basis.[36] During the pandemic, ASHA workers were expected to deliver services beyond their usual mandate. A key step in tackling the concurrent health and climate crises is to ensure that the millions of ASHA workers are full-time employees with higher salaries, which will help benefit India's health system and revive the country's severely impacted economy post the pandemic.

Additionally, the Ministry of Health and Family Welfare's National Action Plan on Climate Change and Human Health—aimed at creating awareness among the general population, healthcare providers and policymakers around the impacts of climate change on human health[37]—mentions that frontline personnel, namely auxiliary nurse-midwife, ASHA workers, and *anganwadi* (rural child care) workers, must assist in the implementation of the plan at local levels. While adopting this action plan has been slow, it holds great potential to scale up climate change and health-related interventions driven by women workers at the grassroots level.

Conclusion

India has a tremendous opportunity to guide the global trajectory on climate change by adopting sustainable development practices. Local solutions are a starting point for implementation, but scaling them up is essential for such solutions to impact future climate scenarios significantly. Ensuring women's full and equal participation, focusing on their substantial contribution to climate-compatible development programmes, is imperative to achieving a successful green recovery. While gender has been increasingly factored into international climate policy, progress in India has been slow to reduce gender-based disparities and involve women in climate change mitigation, adaptation and disaster risk-reduction policy decisions and management. Civil society and philanthropists must adopt a climate and gender lens by planning skilling and training programmes for women's employment, focusing on green

jobs, and improving women's access to rights. Given that a significant portion of India's workforce is employed in agriculture, there is a need to improve women's entitlements as farmers and recognise their unpaid labour. There is also a need to create programmes that support community institutions to address structural governance challenges that constrain women's participation in decision-making.

While treading towards a green recovery, India must accommodate a key demographic—adolescent girls. Research has shown that the vulnerability of adolescent girls to climate change due to the combined effects of age and gender discrimination has severe implications on many of their rights.[38] There is enormous potential for adolescent girls to play decisive roles in identifying practical solutions to address climate change. Government and civil society programmes must involve girls in designing, implementing, and measuring climate strategies. Training and education programmes must support girls to learn the skills needed to respond to climate impacts, take a prominent role in driving climate action, and hold leaders accountable to their commitments and responsibilities. A green recovery not only entails building back with reduced greenhouse gas emissions but also creating a sustainable, equitable, and inclusive society that enables a billion to thrive.

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13

Investing in Materials Innovation is Investing in India's Future

Nisha Holla

Materials science is one of the most influential innovation moats for sustainable and resilient socioeconomic growth. India's upward trajectory towards a middle-income economy started with economic liberalisation in 1991 at a Gross Domestic Product (GDP) of US$275 billion. Growing at roughly 8 percent annually in US dollar terms, India surpassed the UK and France in 2019 to join the top five global economies in nominal GDP terms.[1] It is the only economy with the potential to join the US$10-trillion economy club after the US and China, due to favourable tailwinds in demographics, consumption and technological capabilities.

India has to achieve this feat by providing sustainable development and growth opportunities to its 1.38 billion citizens. Demand for clean and efficient energy, sustainable mobility, cutting-edge healthcare, urban infrastructure, potable water and other amenities will rise exponentially as India's population stabilises and more people join the middle class. These are economic pillars that are integral to core government functions. In a post-COVID-19 macro-environment, most of these functions may also be elevated to the status of national security concerns.

Innovation in materials science can support the fundamentals of fulfilling these core government functions:

- **Water and sewage treatment**: Materials and biosciences are indispensable to finding novel energy-efficient methods to treat the increasing amounts of human and industrial waste, toxic effluents, heavy metals, microorganism, and contaminants in freshwater systems. Research in nanomaterials, adsorbates and composite materials, that can serve in potable water generation, needs to be a sustained national priority.

- **Health and pharmaceuticals**: Bio- and materials sciences are combining—in innumerable ways—to push the frontiers of product and process development in health and pharmaceuticals. The ability of materials science principles to expand the scope of therapeutic drugs, vaccine delivery and diagnostic methods via novel microscopic and nanoscopic pathways is widely recognised. It also enhances candidates for biomaterials that can interface with organic body parts like in orthopaedics and can fundamentally improve the quality of life for amputees and the disabled. Materials innovation can also provide solutions to systemic

challenges like wound healing and non-invasive continuous monitoring that become crucial when dealing with large populations that are living longer and require long-term medical and hospice care.

- **Infrastructure building materials**: As the demand for high-capacity and quality infrastructure ramps up, it is crucial to engineer lighter, more durable and sustainable building materials. Next-generation smart materials like self-healing and self-luminous concrete, 3D graphene, aerographite and hydroceramics, to name a few, are critical to maintaining low per-capita energy and raw materials consumption while serving the surging demand for modern infrastructure in this growing economy.

- **Manufacturing and processing technology:** As the indigenous production of goods ramps up, it is essential to invest in next-generation manufacturing materials like engineered polymers, advanced composites and hybrids, and metals and alloys with specific properties, such as thermal resistance, energy efficiency and reduced carbon intensity. The use of new materials and composites in production-line components can help cut costs, increase service life, reduce downtime and increase productivity. Further, sensing and characterisation technologies to prevent manufacturing defects and the use of smart materials and data analytics to minimise inefficiencies will require significant investment in materials science research.

- **Energy and renewables**: India's focus on energy and renewables is prudent to reduce both the emission burden and dependence on foreign economies for fossil fuels. Increasing energy harvesting efficiency from solar, wind, and water, and introducing lower-cost materials that ultimately make technologies viable for mass deployment hinges on identifying new materials and mechanisms. New battery chemistries will enhance energy storage at the individual- and grid-levels, and enable higher renewable energy utilisation. Other material types like piezo-electrics, 2D materials and polymers are encouraging candidates to unlock new energy generation and storage modes. There are also promising catalysis-based energy generation methods like photocatalysis and electrocatalysis, which currently cannot be deployed large-scale due to inefficient catalyst candidates. Materials innovation can change this.

- **Mobility**: Two critical factors in increasing the efficiency of mobility options while reducing the pollution burden are moving away from fossil fuels and engineering lightweight carriages. Both need significant materials innovation to deliver a steady user experience continually. Reducing fossil fuel dependence requires innovation in batteries, magnets and magnetic levitation technologies, fuel cells and other compact energy modes. Improving battery technology involves innovation in the current standard lithium-ion and future candidates like metal-air, metal-ion and solid-state batteries. Hydrogen and solid-oxide fuel cells also show promise to replace conventional internal combustion engine-based transport. Apart from these new modes, lightweight design also necessitates innovation in hybrid materials, composites and alloys.

- **Food and agriculture**: The biggest problem in food and agri-supply chains is often not production but distribution and supply inefficiencies, leading to large-scale spoilage and wastage. Materials innovation can make cold chains more energy-efficient, increase the shelf life of produce and decrease microbial action at high temperatures. Food packaging is amongst the largest contributors to consumer-generated solid waste, and investment in bio-degradable materials will improve the sustainability of the food supply chain in the country.

- **Defence**: A country's defence network needs constant upgrades to actively combat new security threats and maintain operational effectiveness. Lightweight but durable materials, weather-resistant clothing, self-healing materials, biomimetic design, aerofoils and cyber protection all become critical to soldiers' and armies' abilities to survive in extreme temperatures and enforce border integrity. Autonomous bipedal and quadrupedal robots and unmanned aerial vehicles are being integrated into core defence and military strategies by many countries, and employ a significant materials innovation component. Advanced-composites are critical to deploying large-scale military strategies using materials innovation.

Apart from the core economic pillars of governance, frontier technologies that are equally important to maintaining economic security also require significant materials innovation:

- **Computing**: As human lives become intertwined with the digital, computing capabilities that unlock faster transmission, efficient data storage and quicker

processing are becoming vital to economic operations. Materials innovation drives computing beyond silicon's capabilities and towards the intensive requirements of artificial intelligence, machine learning, and quantum and neuromorphic computing. New materials that enable graphene-based microchips, organics-based molecular electronics, and DNA data storage look promising and require significant investment in research and development (R&D). These new modes of computing run on high amounts of energy and require adequate cooling, which also needs next-generation materials to enable useful and hybrid heat transfer modes.

- **Space**: Space is an essential economic frontier for communications, terraforming, mining new materials, and extended national security operations. There is always a need for lightweight materials to reduce operational costs and resource utilisation in space while providing multifunctional capabilities like radiation shielding, stability in extreme temperatures, specific electro-thermal-mechanical properties and self-healing. Shape memory alloys and polymers will fuel the engineering of smart wings (like birds) that can optimise flight patterns, not just in space flight but ordinary air travel as well.

- **3D printing**: 3D printing, or additive manufacturing, enables decentralised and customisable manufacturing, and is increasingly unlocking newer economic avenues. Customisable prosthetics, implants and organ tissue like liver and corneas are driving individualised healthcare. In manufacturing too, 3D printing allows advantages like on-demand production and the design and production of new materials and composites with specific properties that cannot be obtained in bulk manufacturing. Metal 3D printers are currently a global objective as this capability will enable waves of innovative additive manufacturing and reduce or eliminate the many problems associated with subtractive manufacturing. Further, multi-materials 3D printers that can combine different materials to produce hybrids with specific properties can accelerate many economic sectors like construction and manufacturing.

- **Robotics**: Robotics is a crucial field as it enhances human ability to build and maintain large economic systems multifold—infrastructure, natural environments, space fleets, crop harvesting, and several other applications have embraced automation through robotics. Robotics is already revolutionising the fields of surgery and medical delivery. It will soon pave the way for deployable

nanobots in the human body to identify diseased cells and deliver targeted therapeutics. Robots will become ubiquitous and require materials innovation in low-density structural components, fast electronics, sensors, bio-compatible embedded systems and many other streams.

Undoubtedly, the nation(s) that develop the specialisation, technology, design and intellectual property (IP) in materials innovation will lead the world economically and command favourable economic and trade agreements. India must invest in attaining that position with a 50-year outlook.

Leading Economies

India is active in materials science innovation;[2] however, it pales in comparison to the investments leading economies like the US, China, Germany and Japan have made in frontier materials science innovation.

The US spends about 3 percent of its US$21-trillion economy on innovation and research, while China spends 2 percent (of US$15 trillion), Japan spends 3.6 percent (of US$5 trillion), and Germany spends 3 percent (of US$3.9 trillion)[3]. All four economies operate on advanced infrastructure, technology and manufacturing, which incorporate significant materials innovation. In contrast, India spends less than 1 percent (of nearly US$3 trillion) on innovation R&D. Further, the leading economies have developed large, specialised workforces for research—on a per million population basis, the US has 4,500 researchers; China 1,000; Japan 5,500; and Germany 4,500.[4] India has only 100 per million population, a direct consequence of brain drain and the dearth of major government research grant programmes for universities and research laboratories.[5]

Materials innovation is a core component of these countries' innovation spending. The US has entrenched research funding organisations like the Defence Advanced Research Projects Agency (DARPA) and the National Science Foundation (NSF). DARPA was founded in 1958, and materials science has been a core driver since 1960.[6] Key innovations out of the DARPA ecosystem, like radar evasion, GPS, aeronautics and drone technology, have become ubiquitous today and stem from their focus on new materials. Research under the DARPA programme often results in dual-use technologies, by the military and the government to provide advanced services to the

American citizenry. In 2020, DARPA's funding amounted to US$3.46 billion, nearly all of which is directed towards scientific and technological development.[7]Similarly, the NSF offers sustained grants to top universities to advance cutting-edge materials science research.[8] Foundational programmes like DARPA and NSF ensured that the US remained an undisputed leader in materials science research for decades.

The US also launched the Materials Genome Initiative (MGI), a "federal multi-agency initiative for discovering, manufacturing, and deploying advanced materials twice as fast and at a fraction of the cost compared to traditional methods"[9] by adopting informatics, machine learning and multivariate data analysis. Discoveries under MGI are fuelling the rapid deployment of advanced materials in the US's design and production chains.

Meanwhile, China has invested heavily in scientific research and is fast catching up with the US. The National Natural Science Foundation of China (NSFC) had a budget of US$3.9 billion in 2016 and accounted for a third of China's research funding.[10] Materials science is one of eight main pillars funded by NSFC's Open Application Fund. China has also developed a cluster model for funnelling research into productisation with the National High-tech Zones, responsible for developing the "world's first U disk, China's first supercomputer, and its first AI chip", among other innovations.[11] These clusters concentrate innovation-driven industries and benefit from high-speed infrastructure, talent concentration, and special tax incentives to attract investment.

A Thomson Reuters report tracked publications in materials science and technology placing China in the first position, followed by the US, with India in the sixth position.[12] India published roughly one-fourth and one-third that of China and the US, respectively, with a significantly lower impact score compared to the US and the European Union.

The World Intellectual Property Indicators 2020 report shows China holds 43.4 percent of worldwide patent applications, followed by the US at 19.3 percent and Japan at 9.6 percent.[13] India is in the seventh position, but with a healthy annual growth rate of 7.1 percent. Materials science is not tracked as a unified field, but several fields that incorporate it are witnessing steady growth rates in the number of patents published.

With the establishment of the National Research Foundation (NRF) and an initial five-year outlay of INR 500 billion (US$6.85 billion) in the 2020-21 Union Budget,[14] India is now prioritising scientific research. Funding materials science research that feeds into core and frontier economic pillars must become a fundamental component of the NRF.

A 50-Year Vision

It is impractical for a large and accelerating economy like India to remain dependent on other countries for technology designs integral to every central economic pillar. The country has to own the research, development, IP, design, and production of all these critical components and technologies. For this, it is vital for India to develop innovation engines with a 20-year to 50-year vision of dominating the knowledge economy and using that competitive advantage to become a technology providerand exporter.

The Indian government must focus on building vertically integrated innovation-to-productisation ecosystems to facilitate this vision:

- **Deep funding grant systems**: India must set up comprehensive grant systems to stimulate R&D for all the primary materials science-feeder economic pillars. Non-lapsable grants and follow-on funding for promising ideas and prototypes have been highly successful in the US's DARPA and NSF funding systems. India's NRF must strive to extend the depth of funding, similarly, and aggressively support dual-use R&D.

- **University funding**: Universities hold the greatest critical mass of talent and can be mobilised towards national research goals with adequate funding. Advanced economies have successfully harnessed this intellectual might by allocating a significant amount of grant funding to professors and research students at universities. Institutions also require adequate funding to build world-class laboratories and stay updated with the latest technologies so their researchers have continuity of access to the world's best tools.

- **Research facilities**: Apart from universities, government and private research facilities can be hotbeds of innovation. For example, the US has a string of top-

notch national laboratories, like Sandia and Lawrence Livermore, established during the Second World War and maintained and upgraded continuously to support their research and innovation output.[15] All those laboratories contain a primary materials science component within their research wings.

- **Tax incentives to corporates**: The private sector can be encouraged to partner with the government in India's mission to become a technology leader through tax incentives. Domestic corporates developing indigenous technology that can feed into the economic pillars can utilise the tax incentives to channel funding into R&D.

- **Innovation hubs**: Academic research must go hand in hand with comprehensive productisation and go-to-market pathways to successfully deploy technologies. Innovation hubs have proven very useful in providing these ecosystems. Domestic innovation hubs like the Centre for Cellular and Molecular Platforms have helped scientist-entrepreneurs and academic researchers take their technologies to the market. India must establish innovation hubs for every economic vertical and deepen existing hubs' capacity and capability to provide an innovation backbone.

- **Ph.D scholarships**: India has lost many bright minds to European countries and the US due to a lack of scholarships and world-class facilities.[16] In 2018-19, only 169,170 students were enrolled in Ph.D programmes across the country, amounting to less than 0.5 percent of total enrolment in India's higher education system.[17] India must utilise the NRF outlay to exponentially increase the number of Ph.D positions, especially in core materials science fields, so academic research can be channelled towards economic growth.

- **Government research organisations**: India has some prominent government research organisations that are developing world-class technologies, such as the Indian Space Research Organisation and Defence Research and Development Organisation. These organisations can appoint dedicated chairs for materials science research to focus on key innovation that can result in practical dual-use technologies. The government can pursue targeted IP portfolios that benefit the Indian citizenry while furthering national economic interests.

- **Startup clusters and scale-up spaces**: Apart from academic and research institutions and corporates, startups are crucial to further push the technological

frontier. The number of deep science startups in several verticals, including materials science, biosciences and computing, is steadily growing in India.[18] Ample provision of early-stage government funding and assured continuity of follow-on funding will ensure that startups do not have to suspend operations while raising capital and can quickly ramp up their activities. Further, materials science innovation requires scale-up spaces as activities ramp up from ideation to productisation[19]. Instead of startups wasting precious time procuring land and other amenities, the government's provision of grow-out space will speed the go-to-market process, much like China's National High-tech Zone model.

- **Production chains**: As COVID-19 has shown, it is not viable to remain dependent on China or any other external player to supply essential goods. With this sentiment, India's 2021–22 Union Budget lays down production linked incentive (PLI) schemes for 13 manufacturing sectors, all of which will benefit from core IP generation within the country.[20] As India's IP base expands, it must be linked with PLI schemes and supply chain networks to produce and distribute the products across the country efficiently.

- **Sourcing and upstream supply chains**: Innovation predicated on materials science depends on sourcing of specific metals and rocks; for example, rare earth metals, of which China controls 90 percent of global production and supply.[21] While ramping up innovation engines, India must also ensure sourcing for these technological designs. India recently started creating government-to-government dispensations to secure critical mineral supply chains in South America, including lithium.[22] These forward-sourcing strategies must be part of the innovation-ecosystem support framework.

Conclusion

India undoubtedly needs strong innovation engines as part of its core strategy to scale to a US$5 trillion economy in the next few years and US$10 trillion economy in this decade. An in-depth focus on materials science must be part of this innovation strategy to fuel core economic sectors and frontier sectors that will drive the next economic growth era. When linked to productisation and manufacturing, these innovation engines will fuel economic growth and create an unprecedented wave of employment

prospects for India's 1.38 billion-strong population. World-class technology will always find global markets to export to and create favourable trade positions for India to capitalise. Studying the US and China's ecosystems demonstrates that this is a 20-year to 50-year outlook to reap substantial and long-term returns, and the time to start is now. Investing in materials is akin to investing in India's future.

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