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Technology for Whom and for What? A Global South View of Tech Diplomacy

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ABSTRACT

International politics is linked to its technical-social character. Also, technology is socially constructed and thereby not entirely neutral or impartial. A tech-driven geopolitical landscape has been a defining feature of contemporary world politics. The struggle for global technological supremacy seems to dominate many ongoing discussions on tech diplomacy. But for most developing countries, plagued by inequality, underdevelopment, and exclusion, what are their top concerns? This policy paper explores what countries of the Global South can do to ensure that technology helps humanity end poverty, build resilient societies, protect the planet, and achieve the SDGs by 2030. It is high time for a development-centered tech diplomacy to foster innovation through diffusion, access, inclusion, equitable distribution of benefits, national priorities, and local ownership. Its ultimate goal should be promoting genuine co-governance with the participation of all interested parties in a multi-stakeholder setting, while addressing structural limitations and power imbalances to prevent widening inequalities. Unless we take the concerns of the majority of the world's population seriously, reaping the rewards of the technological revolution will be a privilege confined to a minority, or worse still, controlled by a few hands.

1 | A Challenging Digital Order

The global digital order today is in a state of turmoil, with numerous analyses highlighting the escalating competition among leading powers for technological supremacy. Geopolitical rivalry and fragmented fault lines have been posing significant challenges to the cohesion of a functional digital ecosystem, often obstructing the negotiation of diplomatic solutions at the international level, such as in United Nations processes. Unsustainable practices are fueling increasing inequality and could potentially jeopardize a green and digital future for all humanity.

Against this background, developing countries are not mere spectators but an integral part of this interconnected world that has been in danger of falling apart. The so-called Global South, although neither a homogeneous group nor a single, unified voice in world affairs, is very much alive in political discourse by epitomizing common concerns in the developing world. These concerns cannot be ignored if technology is supposed to contribute to the development of societies comprising the majority of the world's population.

This article will address how a development-centered tech diplomacy can be instrumental to developing countries as they strive to make headway in these turbulent scenarios of growing disagreements on technological issues of critical importance. Most importantly, the Global South has a key role to play in helping build commonly accepted rules and minimum standards, through international cooperation and effective global governance, to prevent even more disturbing prospects in the near future. Mindful of power asymmetries and exclusion risks, these countries can show that a "Tech Cold War" is not inevitable and should not shape decisions that are not aligned with their interests, views, and priorities.

2 | Technology and International Relations in the Digital Age

As the first hominids in prehistory, technology has been central to the evolution of the human species. The success of *Homo sapiens* in the Paleolithic was strongly linked to the power of their intellect to use wood, stone, bones, teeth, and horns of animals to create the first tools designed to cut, dig, scrape, hunt, and ensure their survival. Over time, from the Stone Age to the spread of the agrarian civilizations, new inventions have consolidated and expanded human beings' ability to use and modify the natural environment (Headrick 2009, 15).

The industrial revolutions of the more recent period led to the mechanization of agriculture and the automation of production processes, replacing muscle strength to increase productivity. In the 20th century, Fordism set the standard for modern industry in factories designed to manufacture assembly-line goods for mass consumption. Following World War II, the digital revolution first saw the personal computer (PC) made essential hardware available to almost everyone. Software improvements integrated PC use with the daily routine at work and beyond. The Internet connected the world, allowing data and information to be exchanged almost instantly. Next, with the introduction of the smartphone, users were given the opportunity to have a personal connection 24/7 by utilizing their mobile devices to access cyberspace to do all sorts of things.

Today, with the data-driven knowledge economy leading the digital transformation, machines are encroaching upon cognitive tasks that were once exclusive to the human brain. Chief among the emerging technologies, artificial intelligence (AI) holds great promise as a general-purpose enabling technology with countless applications and use cases, while at the same time creating risks that need to be dealt with properly (Suleyman 2023; Tinnirello 2022). We now have more computing power (hardware), much more sophisticated software (algorithms and AI systems), an abundance of data on the ubiquitous Internet, and increasingly high-quality mobile connections (5G networks). All these converging tools and technologies are the foundation of the existing global digital order, in which AI will soon occupy center stage as a technology set to become the main drive of the next phase of the Digital Age.

The rise of digital technologies has been redefining the nature of power by enabling states to project influence beyond traditional military and economic means, as well as advancing new forms of soft power, such as information warfare and digital diplomacy. But this digital landscape has also introduced more vulnerabilities, with cybersecurity threats becoming a significant concern for national security. States are increasingly using cyber tools to gain strategic advantages, whether by hacking into critical infrastructure, spying on each other, or interfering in other countries' political processes.

International politics is linked to its technical-social character. Also, it is well known that technology is socially constructed and thereby not entirely neutral or impartial. Diplomacy, as it turns out, is embedded in the socioeconomic environment to which it belongs. It is influenced and shaped by the changes brought about by technology. In particular, political and economic relations at the global level take place under the primacy of the digital infrastructure that connects the contemporary world, including computers, the Internet, telecommunications networks, data centers, software systems, semiconductors, submarine cables, satellites, strategic materials, and an array of technological innovations that are changing the way we organize societies and act in time and space. They exhibit a growing impact on the redistribution of power and global governance dynamics. Traditional theories in the discipline of International Relations (IR) have difficulty incorporating these changes into their studies of world affairs (McCarthy 2018).

Human existence cannot be separated from its natural environment, the biosphere. By the same token, it is exceedingly hard to understand modern life without reflecting on how societies are deeply connected to the digital world, which Floridi calls the "infosphere," another reinterpretation of the older concept of "technosphere," comprising all technological production developed by *Homo sapiens* (Gorichanaz 2019). Connectivity is one of the intrinsic elements underpinning international relations in the 21st century, blurring the traditional boundaries between the physical, biological, and digital worlds, not to mention geographical borders and territories. Disconnecting from the Internet and rebuffing the digitalization of the economy have become more impractical every day (Leonard 2021).[1]

Indeed, there are basically two epochal challenges of our time: climate change, with its indiscriminate planetary backlash, extreme weather events, and loss of biodiversity, and the risks associated with technology, from mass unemployment to the militarization of AI and long-term existential threats.[2] What will become of other central issues, such as economic growth, inequality, global health, or geopolitical tensions, will hinge on these two challenges and their consequences to the environment and people's living conditions in the digitally integrated, worldwide biosphere–technosphere human habitat. To resolutely confront global warming, sustainability requires abolishing archaic methods of predatory production that do not consider their social and environmental impacts. Humans used more energy in the 20th century than in the 10,000 years between the agricultural revolution and the Industrial Revolution (Marks 2015, 203). The long-announced end of the oil era still takes its toll. In a sweeping study of the world economy since prehistory, Sachs places the Industrial Era between 1800 and 2000, followed by the Digital Era, which will have to cope with the nefarious legacy of environmental degradation and inequality inherited from the previous era.[3]

Technology has also transformed the practice of diplomacy. Social media platforms have become essential tools for public diplomacy, allowing states to communicate directly with foreign audiences, shape narratives, and influence global opinion. Leaders and diplomats now use these platforms to engage in real-time dialogue, respond to crises, and even conduct negotiations in the public eye. However, the same platforms have also been manipulated to spread disinformation and propaganda. The rise of digital diplomacy has democratized international relations to some extent, but it has introduced new challenges in managing information integrity and maintaining credibility.

A tech-driven geopolitical landscape has been a defining feature of contemporary world politics. At this moment, a decentralized, multilayered governance complex prevails in today's globalized digital ecosystem. Disagreements among leading players are placing additional strain on current efforts to prevent further fragmentation and unconstrained competition. Polarization can potentially deepen existing divisions among countries, companies, and other players. A new "Tech Cold War," combined with signs of an impending process of deglobalization and rising protectionism, may overturn the global interconnectedness that has been the norm over recent decades (Garcia 2023).[4]

The technological competition among the world's leading tech powers, particularly the United States and China, has increasingly been shaping global power dynamics. The United States continues to lead in many areas, largely due to its well-established tech ecosystem and enterprising private sector. China has rapidly been closing the gap, driven by state-led initiatives and substantial investments. As previously noted, this competition is driven by the recognition that technological innovation is not only a key driver of economic growth, but also a critical component of national security and geopolitical influence. The far-reaching consequences for international relations may include the fragmentation of the global digital landscape, a bifurcation of global supply chains, and the emergence of competing technological spheres of influence.[5]

This struggle for global technological supremacy seems to dominate many ongoing discussions on tech diplomacy, both in academia and diplomatic circles. Scharre, for instance, in his book *Four Battlegrounds*, gives a thorough account of the latest developments in the race between the United States and China for the dominance of AI technologies in four domains: data, computing power, talents, and institutional capabilities. His approach is a conspicuous example of how these issues are frequently put into a larger framework of a confrontation between Western democracies and authoritarian governments (Scharre 2023; Diesen 2023; Helberg 2021). This is a recurrent view in many Northern Hemisphere outlets, but one may wonder to what extent the social, economic, or technological priorities of developing countries are met in this context of a race to the bottom among the leading competitors. It is relevant to ask whether, from the perspective of the Global South, a trend toward worsening rivalry will have a positive or negative impact on the development needs of most countries (more on this later).

Tech diplomacy has been defined as "the conduct and practice of international relations, dialogue, and negotiations on global digital policy and emerging technological issues among states, the private sector, civil society, and other groups" (Garcia 2022b). Even though this is just one among other possible definitions in a relatively new area of diplomatic practice and research, it is fair to say that tech diplomacy will be crucial to negotiating disputes and strategic arrangements in the near future, as an umbrella term for all emerging technological issues, such as AI, semiconductors, quantum computing, robotics, Internet of Things, blockchain, 3D printing, augmented and virtual reality, synthetic biology, among others.

What is important to highlight is the fact that Tech Diplomacy is clearly not (only) about a global competition between democracies and authoritarian governments. The meaning attributed to it may differ according to the actors involved and the narratives constructed to advance their goals and promote their interests. Developing countries may either agree or disagree on mainstream interpretations, but the shape and design of their foreign policies should be guided, first and foremost, by their own assessment of what is at stake and what to do about it.

Scholars and practitioners alike would benefit from alternative frameworks to the binary thinking of Us versus Them that characterizes Realist and liberal internationalist readings of global complexity in the IR discipline. These views largely put aside much of what matters to the Global South. It is a matter of embracing a vision of multipolarity that sees the world "as a pluriversal space where multiple realities can and do coexist (and always have)" (Fisher-Onar and Kavalski 2023, 1). Moving beyond traditional polarities, the concept of a "multiplex world order" has been put forward as a distinct approach, not rigidly attached to unipolar, bipolar, or multipolar structures of order. Multiplexity brings to the table key features that help to understand changing global dynamics: absence of global hegemony by any single state; proliferation of actors, large or small, including private companies and non-state actors; interdependence among economic matters, the environment, governance, security, and connectivity; multilevel global governance architecture made up of several layers, formal and informal institutions, networks and hybrid structures; and cultural, ideological, and political diversity (Acharya et al. 2023, 2341).

In the same vein, rather than talking about a "balance of power" among nations, it would be more to the point refer to a "balance of players" depending on the issue at hand (Kello 2024, 51). New and promising approaches have been suggested in the literature, including the notion of "Digital International Relations" (Bjola and Kornprobst 2024). This is not the place to delve into this theoretical discussion. However, it stands to reason that to make sense of the Digital Age, technology must be at the forefront of any attempt to update the IR discipline. In doing so, this larger debate would need the participation of more scholars and policymakers of the Global South as a means of "bringing the Rest in" (Acharya and Buzan 2019, 302). These all-important issues concern all societies and its consideration should not be confined to a few influential actors, requiring instead political will, inclusiveness, and more diverse representation in a plurality of settings.

Technology is not just a tool. It shapes the world and in turn it is shaped by society as well, as it has long been admitted in the literature on science and technology studies. In his latest book, Umbrello (2024) explored the complex narratives that shape our interaction with technology. He questioned the traditional view of technologies as neutral artifacts and unveiled how they embody the values of their creators and may unconsciously reinforce systematic patterns of inequality, discrimination, and oppression. Under the prevailing circumstances, as described above, what are the top concerns for developing countries? How should they approach tech diplomacy going forward?

3 | Developing Countries and the Technological Revolution

Developing countries are facing significant dilemmas as they navigate the ongoing technological revolution. The rapid pace of technological advancements has created a widening gap between technologically advanced nations and those still struggling with poor digital infrastructure, outdated communication networks, and a shortage of computing power. The lack of access to the Internet, limited technical expertise, and insufficient investment in technology education are major barriers to fully participating in the global digital economy. This technological divide exacerbates existing inequalities, making it harder for these nations to leverage technology for economic development and social progress.

While high-speed Internet is taken for granted in much of the developed world, many regions in the Global South still lack reliable connectivity (at times electricity as well), especially in rural areas, where the costs of building infrastructure are high and the potential returns are low. Without access to digital tools, businesses in these regions cannot compete in the global market, and citizens are cut off from opportunities for education, healthcare, and economic advancement. Even when developing countries can access digital technologies, there is often a scarcity of local talent capable of utilizing and innovating with these tools. This skills gap is rooted in underfunded education systems that are ill-equipped to prepare students for the demands of the Digital Age. Additionally, brain drain, where skilled professionals emigrate to developed countries in search of better opportunities, further depletes the talent pool in these nations.

Owing to the above reasons and other underlying factors, numerous Global South countries have been fighting an uphill battle to truly embrace all that technology can bring, bridge the computing divide, and become tech-savvy nations. In many places, technology remains underdeveloped and underused. Power asymmetries, widening wealth disparities, data exploitation, digital neo-colonialism, underpaid annotators, racism and algorithmic bias, vulnerable populations, exclusion from key decision-making circles, and technologies designed out of context, ignoring local realities, are among the most common predicaments. End-users have online access to products and services developed elsewhere, possibly trained with biased datasets that may not be suitable for local needs or national priorities. This will not change overnight.

AI in particular is a case in point, as the cutting-edge development of this technology has been concentrated in very few countries, mostly by private companies. Generative AI has been dominated by software from (and for) English-speaking users. The Global South, nonetheless, represents a sizeable source of human-generated data and a large-scale provider of raw materials upon which complex computing networks and AI systems rely. As technologies are not neutral, more AI models should be trained in less-known native languages in order to reach out to as many people as possible, including disadvantaged groups or vulnerable communities. Developing countries must promote research on AI that speaks their language.

Tech diplomacy for the Global South must ideally prioritize coping with and overcoming these obstacles. The original idea behind TechPlomacy, as proposed by Denmark, was to bring a European perspective based upon human rights and democratic values to US Big Tech companies. As noted by then Danish Foreign Minister, Jeppe Kofod: "we need to make sure that democratic governments set the boundaries for the tech industry, and not the other way around" (Klynge et al. 2020, 1). When tech diplomacy (now the most used term) became a more established practice in the Bay Area of San Francisco, it was initially drawn into a mindset of like-minded countries worried about perceived threats from authoritarian governments. This further complicated the quandary faced by developing countries.

As mentioned above, the growing economic competition between the United States and China, often framed politically as a race for global supremacy, is characterized by fierce rivalry in critical technologies, including in ways to shape international standards and norms that will govern their use. The implications extend far beyond the borders of the United States and China, particularly affecting developing countries, which often find themselves caught in the crossfire. For instance, many African and Southeast Asian countries have turned to China for affordable 5G infrastructure, which comes with significant investments under initiatives like the Belt and Road Initiative (BRI). However, aligning too closely with China could lead to repercussions from the United States, including sanctions or loss of access to US markets and technologies. This can put developing countries in a difficult position, forcing them to navigate the complex geopolitics of technology without undermining their own development goals.

Moreover, the technological divide risks exacerbating inequalities. While advanced economies can afford to invest in emerging technologies, many developing countries struggle with basic digital infrastructure. The focus of tech giants on markets in the United States and China means that innovations are often tailored to the needs and regulatory environments of these countries, leaving the Global South with technologies that are either inaccessible or ill-suited to their contexts. As both powers push for their respective standards and norms in international forums, developing countries may find their voices marginalized. This could further widen the gap and increase the costs associated with technology adoption, limiting economic growth and development opportunities in those regions.

If the practice of tech diplomacy is supposed to go global, it can no longer be confined to a single-minded approach of opposing blocs separating groups of countries by their domestic political systems. It should necessarily incorporate other views from a diverse, heterogeneous set of perspectives from across the world. Again, the political framework of a new "Tech Cold War" is not the only one possible to make sense of technology and international relations today. And for tech diplomacy to be truly global, all interested parties should be engaged more systematically and have their say. But how can we move from a geographically limited scope to actually negotiate a shared international vision of technology governance? How can we include more countries and push forward to a more neutral, non-aligned mindset?

Current thinking and practice of tech diplomacy, broadly understood as an activity not restricted to Silicon Valley, should incorporate the views, values, and interests of developing countries. Opportunities to do so may be found in a number of venues, multilateral organizations, international informal gatherings, or diplomatic initiatives. The Brazilian presidency of the G20 in 2024 is an example of such an approach. In addition to the main priority issues addressed during the Brazilian presidency (combating hunger, poverty, and inequality; sustainable development; and global governance reform), the G20 Digital Economy Working Group included four priorities: information integrity, connectivity, digital public infrastructure, and artificial intelligence.[6] In all of them, a Global South perspective was introduced to contribute to the discussions. Incidentally, this was the first presidency period in which the African Union joined as a fully fledged G20 member.

The Brazilian G20 presidency highlighted priorities on AI for inclusive sustainable development and reduction of inequalities, including for the attainment of the SDGs. For developing countries, current international discussions on AI governance should address a few important questions, such as the following: (a) the concentration of capacities, datasets, and infrastructure under the control of a small group of actors; (b) alternatives to ensure that the developing world has access to and can contribute to further developing AI technologies to fully benefit from them; (c) concerns that AI systems, while global in reach, should be able to reflect a diverse range of linguistic, cultural, racial, and geographical contexts; (d) taking AI as an instrument of inclusion and a valuable ally in the fight against poverty; and (e) focusing on opportunities for international cooperation through knowledge dissemination, capacity-building initiatives, or joint efforts aiming at the development, deployment, and adaptation of AI systems to local realities.[7]

Much has to be done to ensure that technology can help humanity end poverty, build resilient societies, protect the planet, and achieve the Sustainable Development Goals (SDGs) by 2030. Trying to catch up through large amounts of investments is not for everyone, particularly least developed countries facing serious hurdles. Full digital sovereignty and control over one's own data depend on domestic capabilities and appropriate resources. Only a few middle-income countries would be in a position to successfully implement comprehensive, homegrown digital strategies without resorting to international cooperation (Demambro 2024; Larsen 2022).

Global governance initiatives can address these challenges by establishing, for instance, innovative mechanisms to make research facilities and key infrastructure assets available, such as cloud services or supercomputers under multilateral jurisdiction. A collaborative public–private partnership could grant access to technological resources to experts from developing countries. Also, future international governance institutions could include programs specifically designed to promote the peaceful uses of AI, local ownership of research and development, technology diffusion, and on-the-ground implementation in poor countries. Joint research, open access, capacity building, and a fair and equitable distribution of benefits are essential to ensure inclusion and diversity.

The current multilayered digital governance complex, threatened by fragmentation and other pitfalls, is sometimes at odds with the idea of exploring alternatives under the auspices of the United Nations (UN). But digital agreements among like-minded countries are unlikely to become global frameworks if they fail to consider the interests, needs, and demands of non-like–minded countries. Greater international cooperation is badly needed. Some agreements might be rejected in part or in full by powerful states and key players if they did not join the negotiations in the first place. Co-governance of the digital world requires participation, consent, and frameworks discussed with non-like–minded countries as well.

One possible way forward would be to negotiate a multidimensional framework, with balanced criteria, in favor of development and against inequalities and digital gaps, based upon a multi-sectoral approach, with a broad representation of the world's majority.[8] A multilateral setting could probably help to ensure better global representation. The UN would be in a privileged position to provide an inclusive platform for cooperation with the participation of multiple stakeholders. However, we face a crisis of confidence in international institutions. The scramble for technology has not been contributing to bringing countries together and helping them overcome their differences. At the global level, there is convergence on some high-level principles, but little agreement on how they should be implemented. A large number of governance tools are missing, such as normative instruments, institutions, and technical standards. A multi-stakeholder–based agile governance should be welcomed, but states need to be on board and engaged in this debate about policy design and implementation. Also, we need to place the interests of the Global South on equal footing with those of the leading powers.

On a more positive note, the negotiations that led to the adoption of the Global Digital Compact, coordinated by the Office of the UN Secretary-General's Envoy on Technology, sought to highlight several pathways and concrete measures on digital cooperation, in close consultation with Member States, the technology industry, private companies, civil society, and other stakeholders. The results, endorsed by the Summit of the Future in September 2024, were particularly fruitful in terms of outlining a set of cross-cutting and mutually reinforcing principles for an inclusive, development-oriented, human rights-based, gender equality and empowerment, environmentally sustainable, equitable, accessible, interoperable, responsible, innovation-friendly, multi-stakeholder, and forward-looking cooperation. Developing countries were actively involved in all stages of the negotiations and were able to make a meaningful contribution to the document throughout the process, which also included commitments and actions to achieve the GDC's goals.[9]

Technology should be beneficial for everyone, everywhere, respecting the rich cultural diversity of the world's population and the local needs of different societies across the globe. Developing countries can play a pivotal role in promoting further dialog and bridging the gap between technologists (developers, engineers, experts from private companies) and policymakers (leaders, politicians, diplomats, governmental officials, parliamentarians) to create opportunities for interconnection between these two worlds, with special regard to policymaking in the digital domain. In the next section, other recommendations will be suggested to implement a much-needed development-centered tech diplomacy (Robinson et al. 2023).

4 | Digital First: The Need for Tech-Forward Foreign Policies in the Global South

Back in 1945, when the UN Charter was signed, San Francisco became the birthplace of the United Nations. Now San Francisco has become the birthplace of tech diplomacy. Despite recent ups and downs, Silicon Valley is still the largest technological hub and the world's most important innovation cluster (Ittelson and Rauchbauer 2023). Being a tech diplomat in San Francisco, however, is not only about reaching out to the Big Tech companies, but engaging with the whole innovation ecosystem, including startups, incubators, accelerators, venture capital investors, research centers, and universities. Today's technological revolution has a global reach, and to confidently move in this vast ecosystem, tech diplomats need to connect policymaking and technical knowledge. This is a role they can perform because diplomats are usually trained in dealing with different settings, linking particular areas with the wider concerns of governments and society.

Tech diplomacy has been growing in importance. If more countries join this exercise, the debate will benefit from diverse opinions on a wide range of issues. In 2023, the tech diplomacy Network was launched to foster collaboration and dialogue between the diplomatic community, civil society, and the technological industry in the Bay Area and beyond. They organize events, workshops, and provide resources for tech diplomats trying to navigate the complex and rapidly changing world of technology. It aims to become a hub for the diplomatic community to exchange ideas and share best practices. The Network is open to a global audience, seeking to promote international understanding in a hyperconnected world.[10]

Against this background, states in the Global South that have yet to introduce dedicated measures for a newly tech-oriented geopolitical landscape must examine their course of action carefully. Tech diplomacy may have been born in Silicon Valley, but it is now a global endeavor with different places to engage with and many dots still to be connected. Developing a tech-forward foreign policy plan is imperative for international cooperation on technological issues and active participation in these new alliances, coalitions, and initiatives.

Where the green economy meets the knowledge economy, any sound and future-proofing national strategy should consider the green-digital future we want for the next generations. There is already clarity regarding the urgency of addressing climate change and promoting the energy transition toward the decarbonization of the economy, expanding the use of renewable resources, and combating deforestation, among other measures, by utilizing science and technology more effectively. The dual nature of the environmental and technological challenges that lie ahead calls for adding a Digital First priority to foreign policy as a vital and inseparable element of diplomatic practice in the interconnected biosphere-technosphere we live in, in which technology influences forms of interaction and coexistence far beyond the state (Bjola and Manor 2023).

This tech-forward foreign policy would link sustainability and digitalization toward a green-digital economy, environmentally balanced, inclusive, adapted to the low-carbon market, digitally proactive, and based upon technological awareness, free from the burdens and anachronisms of the past and aimed at building nations with less inequality, greater distribution of wealth, and expansion of access channels to development for the benefit of society as a whole. A foreign policy with these characteristics would need to be aligned with national innovation ecosystems to create productivity gains that allow the economy to grow, connecting it to innovative practices that are changing the market, such as those introduced by Industry 4.0, startups, and high-impact business entrepreneurs.

Most importantly, a Digital First mindset must be incorporated into foreign policy discourse and practice. If leaders, politicians, legislators, diplomats, journalists, and experts do not integrate this dimension into their priorities, financial resources will be missing for what needs to be done. The political will to push this agenda, engage all the actors concerned, domestically and overseas, mobilize resources, and amass adequate investments is a sine qua non condition for a tech-forward foreign policy to succeed.

Whenever possible, developing countries should avoid the risk of falling into a tragic combination of late industrialization and early deindustrialization by seeking to develop their own competencies in converging and enabling technologies, thus reducing their dependence on external suppliers and unexpected instabilities in the global market. There are, of course, varying degrees of country-specific digital exclusion, depending on the social class or region, which restrict the access of a large part of the population to public and private services offered online. Poor people may not have or struggle to benefit from resources in education, health, remote work, business, social life, and digital citizenship. They are frequently not equipped to exercise their rights and master the digital tools that are gradually becoming more essential in everyone's daily lives.

In many places in the Global South, countries are still lagging behind or just beginning the transition to both the green and knowledge economy, although not at the desired speed. But without prioritizing technology and innovation in the public debate, government planning, and private ventures, it will be much more difficult to adopt cross-agency policies supported by investments to provide quality education and foster a solid digital infrastructure of computing, data, networks, talents, and AI systems.

The necessary ethos to effect change must also include revising the mental maps traditionally used to observe, assess, and make decisions. Several concepts are obsolete and require updating. Contemporary international relations take place at many levels as a structurally heterogeneous, polycentric, largely unpredictable system, affected by fissures and asymmetries of all kinds, with overlapping spheres of authority that compete with each other and coexist with complex networks of transnational and subnational, public and private, governmental and non-governmental forces. Binary, analogical, and one-dimensional thinking, motivated by deep-rooted convictions, is ineffective in understanding an intrinsically fluid, non-linear, and often ambiguous political environment in which uncertainty prevails (Spitz and Zuin 2022). If the understanding of these phenomena is flawed, the resulting foreign policy decisions might be suboptimal or even disastrous in some cases.

We live in a time of political divergences and fragmentation of global governance efforts in different sectors. Building areas of convergence will depend upon the collective action of countries interested, first and foremost, in promoting the uses of technology for development. Decisive participation in international forums, with well-defined purposes, involves including talking points on the agenda of bilateral meetings, coordinating common policies at the regional level, exercising multilateral normative leadership, and engaging in dialogue and negotiations on global digital policy between states, the private sector, and civil society (Garcia 2022a).

It is high time for a development-centered tech diplomacy to foster innovation through diffusion, access, inclusion, equitable distribution of benefits, national priorities, and local ownership. Its ultimate goal should be promoting genuine co-governance with the participation of all interested parties in a multistakeholder setting, while addressing structural limitations and power imbalances to prevent widening inequalities associated with pre-existing digital divides. For countries of the Global South, outlining a strategic vision for a tech-forward foreign policy is essential to both proactively engage in new tech-oriented discussions and address their concerns to shape international cooperation in the right direction.

Also, incorporating best practices of digital transformation into the daily work of diplomats will be essential to modernizing the public sector in these countries. Adopting new e-government tools goes far beyond social media. It is a matter of administrative efficiency, improvement of consular services, and resources for decision-making, prediction, political analysis, and potentially other diplomatic activities at the Ministry of Foreign Affairs (MFA) and other agencies. Agility is an antidote to obsolescence in a world of instant, 24/7 information, big data, and smart machines. Digital literacy for government employees and foreign service members must begin early, upon entry into their careers, so that they can assimilate the basic language employed by technologists, developers, computer engineers, and scientists.

A Digital First strategic vision can empower developing countries by equipping them with the knowledge, tools, and frameworks necessary to become more influential, thereby enhancing their capacity to contribute to global digital policies and leverage opportunities for their own technological development and economic competitiveness. The implementation of a digital foreign policy that aligns with global trends and addresses national interests would require a comprehensive assessment of the current digital landscape, capabilities, and projected needs, with stakeholders from the government, the private sector, and civil society engaged in identifying key priorities and challenges. Tech diplomacy training programs and policy development workshops can enhance capacity-building, possibly in partnership with international organizations and other players for resource sharing and expertise.

At this point, it can be useful to examine a few practical actions developing countries could take to gain a competitive advantage and move from traditional approaches to new roles and strategies suitable for these fast-changing scenarios. In doing so, decision-makers have to evaluate whether they should use existing structures, change them, if need be, or create brand new institutional arrangements. Firstly, MFAs could consider appointing a Tech Ambassador or Tech Envoy with a global mandate to both engage in international exchanges and develop a strong connection with the domestic science, technology, and innovation ecosystem. Secondly, securing a core team of tech diplomats and experts at Headquarters, knowledgeable of emerging technologies and policy debates, while at the same time dispatching tech diplomats overseas at Embassies, Consulates, and international organizations around the world, with a focus on strategic places where tech diplomacy is more demanding. And thirdly, drafting a dedicated tech-focused foreign policy strategy to put all players on the same page and give direction to a whole-of-government approach (Erzse and Garson 2022).

By putting forward this menu of choices, Erzse and Garson (2022, Executive Summary) also suggested three capabilities that are essential to success in a new tech-shaped geopolitical era: (a) anticipatory situational awareness: staying ahead of technological change and its impact on international dynamics; (b) coordinated policy positions: reducing complexity in both domestic and foreign policy initiatives; and (c) a clear strategic vision: driving policy in line with priorities, values, and interests defined domestically.

Encouraged by this renewed approach, tech diplomats from developing countries can play an active role in a number of areas: pushing for international cooperation; engaging in global policymaking; supporting efforts to ensure responsible use of new technologies; exchanging views and coordinating positions; promoting a common vision for the future; or joining forces with other partners in cross-region institutions. They can also embrace multi-stakeholderism; engage civil society, private companies, researchers, and other stakeholders in bona fide cross-cultural dialogues; pursue geographical and gender balance to ensure broad representation at all levels; promote normative leadership; invest in capacity-building to empower people and foster tech literacy among vulnerable communities; seek inputs from marginalized groups and neglected audiences; and learn from multidisciplinary perspectives by bringing new voices to the table.

Last but not least, developing countries should be realistic about their goals in all these areas, starting with a few small-scale projects to build upon proven success. Efforts need to focus on sectors where technology can have the greatest impact to address their most pressing challenges, such as poverty, unemployment, and access to education and healthcare. Simultaneously, a framework for the ethical deployment of technology must develop policies to address issues like human rights, privacy, data protection, cybersecurity, responsible AI regulations, and so on, in close coordination with other domestic players.

These policies and actions could benefit tech diplomats by enabling them to collaborate better with international partners for improved technological access, joint research projects, technology transfer agreements, and capacity-building programs. Their engagement in multilateral and plurilateral discussions on tech governance and digital rights will also be strengthened accordingly, securing a seat at the table to help forge the rules of the road for emerging technologies and the future of the global digital order.

5 | Conclusion

Technology is not just a backdrop to international relations in the Digital Age. It is a driving force that is reshaping the landscape of world politics. From cyber warfare and digital diplomacy to global governance and the empowerment of non-state actors, technology is influencing the way states and other actors engage with one another, creating new opportunities and challenges in the pursuit of peace, security, and prosperity.

Global tech policymaking demands responsible strategies to prevent disturbing scenarios, build commonly accepted rules and minimum standards, and foster international cooperation to avoid strategic uncertainty. Predictability by means of norm-setting is in everyone's interest. Effective global governance means that international issues are to be addressed in good faith by all interested parties, following procedures commonly agreed upon to uphold the rule of law and fairness.

Tech diplomacy will be increasingly called to manage the globalized digital ecosystem as it stands today to reach political solutions that can accommodate all views and concerns as much as possible. If one of the goals is to develop a truly global framework, say, under the auspices of the United Nations, global digital agreements by like-minded countries are unlikely to become the primary source of legitimacy if they fail to consider the interests, needs, and demands of non-like-minded countries, many of them in the Global South.

The tech-forward foreign policy proposed in this article has been thought to have in mind a green-digital economy based upon emerging technologies and reconciled with the natural environment. Will governments give the required priority so that large-scale public policies reflect these demands and accelerate these transformations by means of clear strategies, structural change, and robust partnerships? Understanding where long-term trends are heading (Dark 1998), bearing in mind the socio-economic foundations of foreign policy, is essential to make the best decisions and avoid repeating previous mistakes.

Tech for good is the only way to ensure that technology is developed and utilized not for exploitation or to divide and conquer, but to search for common solutions as we try to solve the many intractable problems humanity faces. Technology is too important to be left to technologists alone. This is why tech diplomats need to be bilingual: speak the languages of both diplomacy and technology to bridge the gap between technologists and policymakers. Global co-governance can only succeed with the participation of a wide range of players in a multi-stakeholder setting, with developing countries actively engaged. Unless we take the concerns of the majority of the world's population seriously, reaping the rewards of the technological revolution will be a privilege confined to a minority, or worse still, controlled by a few hands.

Conflicts of Interest

The author declares no conflicts of interest.

Data Availability Statement

Data sharing not applicable to this article as no datasets were generated or analysed during the current study.

Endnotes

[1] It should be noted that connectivity can unite people but paradoxically also cause conflict.

[2] Address of the United Nations Secretary-General to the 73rd General Assembly, September 25, 2018, https://www.un.org/sg/en/content/sg/speeches/2018-09-25/address-73rd-general-assembly.

[3] Sachs (2020).

[4] A "Tech Cold War" gone wrong could increase AI risks and seriously jeopardize the global order in the long run.

[5] Such fragmentation could lead inter alia to a "splinternet," where parts of the world are governed by different sets of technological standards and norms, reducing global interoperability and cooperation.

[6] G20 official website: https://www.g20.org/en. Accessed April 2, 2024.

[7] Issue Note, G20 Digital Economy Working Group, internal document, 2024. It was also stressed that all countries should have the opportunity to promote the development and deployment of AI systems with a view to enhancing the quality of life for their peoples by applying innovative solutions in critical areas such as healthcare, education, food security, economic development, job creation, and income generation.

[8] See, for instance, the outcome document of NET Mundial+10 held in São Paulo in April 2024. https://netmundial.br/netmundial-10-multistakeholder-statement-strengthening-internet-governance-and-digital-policy-processes Accessed April 30, 2024.

[9] Global Digital Compact, Office of the UN Secretary-General's Envoy on Technology, https://www.un.org/techenvoy/global-digital-compact Accessed September 25, 2024.

[10] Tech Diplomacy Network website: https://www.tech-diplomacy.org. Accessed January 10, 2024.

References

Acharya, A., and B. Buzan. 2019. *The Making of Global International Relations: Origins and Evolution of IR at Its Centenary*. Cambridge University Press.

Acharya, A., A. Estevadeordal, and L. W. Goodman. 2023. "Multipolar or Multiplex? Interaction Capacity, Global Cooperation and World Order." *International Affairs* 99, no. 6: 2339–2365. https://doi.org/10.1093/ia/iiad242.

Bjola, C., and M. Kornprobst, eds. 2024. *Digital International Relations: Technology, Agency and Order*. Routledge.

Bjola, C., and I. Manor, eds. 2023. *The Oxford Handbook of Digital Diplomacy*. Oxford University Press.

Dark, K. R. 1998. *The Waves of Time: Long-Term Change and International Relations*. Continuum.

Demambro, J. 2024. "Contesting Digital Sovereignty: Untangling a Complex and Multifaceted Concept." Pre-print version of M. Jiang and L. Belli (eds.), *Digital Sovereignty in the BRICS Countries: How the Global South and Emerging Power Alliances Are Reshaping Digital Governance*. Cambridge University Press. https://cyberbrics.info/contesting-digital-sovereignty-untangling-a-complex-and-multifaceted-concept.

Diesen, G. 2023. *Great Power Politics in the Fourth Industrial Revolution*. Bloomsbury.

Erzse, A., and M. Garson. 2022. *A Leaders' Guide to Building a Tech-Forward Foreign Policy*. Tony Blair Institute for Global Change. https://www.institute.global/insights/tech-and-digitalisation/leaders-guide-building-tech-forward-foreign-policy.

Fisher-Onar, N., and E. Kavalski. 2023. "From Trans-Atlantic Order to Afro-Eur-Asian Worlds? Reimagining International Relations as Interlocking Regional Worlds." *Global Studies Quarterly* 2, no. 4: 1–11. https://doi.org/10.1093/isagsq/ksac080.

Garcia, E. V. 2022a. "AI Diplomacy: Five Recommendations to Developing Countries." Medium. https://medium.com/@egarcia.virtual/ai-diplomacy-five-recommendations-to-developing-countries-163e57f85a48.

Garcia, E. V. 2022b. "What is Tech Diplomacy? A Very Short Definition." Beyond the Horizon, International Strategic Studies Group (ISSG). https://behorizon.org/what-is-tech-diplomacy-a-very-short-definition.

Garcia, E. V. 2023. "AI Risk and Global Order: Will AI Governance Survive a New Tech Cold War?" AI Supremacy newsletter, Substack. https://aisupremacy.substack.com/p/ai-risk-and-global-order-will-ai.

Gorichanaz, T. 2019. "Basic Concepts From Floridi's Philosophy of Information." http://scratchtap.com/basic-concepts-from-floridis-philosophy-of-information.

Headrick, D. R. 2009. *Technology: A World History*. Oxford University Press.

Helberg, J. 2021. *The Wires of War: Technology and the Global Struggle for Power*. Avid Reader Press.

Ittelson, P., and M. Rauchbauer. 2023. *Tech Diplomacy Practice in the San Francisco Bay Area*. DiploFoundation, Swissnex, République et Canton de Genève. https://www.diplomacy.edu/resource/tech-diplomacy-practice-in-the-san-francisco-bay-area.

Kello, L. 2024. *Digital International Relations: Technology, Agency and Order*, 51–72, edited by C. Bjola and M. Kornprobst. Routledge.

Klynge, C., M. Ekman, and N. J. Waedegaard. 2020. "Diplomacy in the Digital Age: Lessons From Denmark's TechPlomacy Initiative." *Hague Journal of Diplomacy* 15, no. 1–2: 1–11. https://brill.com/view/journals/hjd/15/1-2/article-p185_10.xml.

Larsen, B. C. 2022. "The Geopolitics of AI and the Rise of Digital Sovereignty." Brookings Report. https://www.brookings.edu/articles/the-geopolitics-of-ai-and-the-rise-of-digital-sovereignty.

Leonard, M. 2021. *The Age of Unpeace: How Connectivity Causes Conflict*. Bantam Press.

Marks, R. B. 2015. *The Origins of the Modern World*. Rowman & Littlefield.

McCarthy, D. R., ed. 2018. *Technology and World Politics: An Introduction*. Routledge.

Robinson, S., M. Adamson, G. Barrett, et al. 2023. "The Globalization of Science Diplomacy in the Early 1970s: A Historical Exploration." *Science and Public Policy* 50, no. 4: 749–758. https://doi.org/10.1093/scipol/scad026.

Sachs, J. D. 2020. *The Ages of Globalization: Geography, Technology and Institutions*. Columbia University Press.

Scharre, P. 2023. *Four Battlegrounds: Power in the Age of Artificial Intelligence*. W. W. Norton & Company.

Spitz, R., and L. Zuin. 2022. *The Definitive Guide to Thriving on Disruption: Volume I - Reframing and Navigating Disruption*. Disruptive Futures Institute.

Suleyman, M. 2023. *The Coming Wave: Technology, Power, and the 21st Century's Greatest Dilemma*. Crown.

Tinnirello, M., ed. 2022. *The Global Politics of Artificial Intelligence*. Routledge.

Umbrello, S. 2024. *Technology Ethics: Responsible Innovation and Design Strategies*. Polity Books.