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The globalization of science diplomacy in the early 1970s: a historical exploration

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Abstract

The early 1970s brought fundamental transitions in international scientific collaboration that significantly affected the international relations in global patterns that are still relevant today. This article uses a multi-perspective approach to argue that the underlying condition for the globalization of science diplomacy was the increasing participation of recently independent countries in international technoscientific affairs, examining critical research areas, including space exploration, oceanography, nuclear technoscience, the environmental sciences, and health and population studies. Themes emerged at that time that continue to characterize what we term 'Global Science Diplomacy': multipolarity, resistance and agency, lack of global consensus, regional alliances and interests, and the centrality of the United Nations system to the conduct of transnational science. This survey is a first step in historical reflection on this phenomenon and shows that it was the emergence of the Global South in Science Diplomacy affairs that made Science Diplomacy global at the beginning of the 1970s.

Key words: science diplomacy; globalization; Global South; 1970s; Cold War.

1. Introduction

Science diplomacy is a global phenomenon. Its worldwide manifestation came amid the globalizing impulses of the 1970s, years that historians have already identified as crucial for the processes and institutions of globalization that are relevant today (Ferguson et al. 2011; Hellema 2019; Heymann 2017). The growing number of newly independent countries represented in the United Nations (UN), the emergence of regional geopolitical powers and alliances, and the increasingly important role of science and technology in tying distant economies and societies together have all profoundly shaped science diplomacy, just as they shaped changes in the global economy, popular culture, and geopolitics (Turchetti et al. 2012; Oreskes and Krige 2014; Adamson and Lalli 2021; Krige 2022). This globalization in science diplomacy merits its recognition alongside commercial, cultural, and economic globalization as an emerging trend of the early 1970s.

A full historical accounting of the emergence of what we term 'global science diplomacy' requires a particular kind of approach, featured here. Not only do we treat science as a transnational phenomenon, but we do so from a multitude of perspectives and narrative origin points (Turchetti et al. 2012;

Oreskes and Krige 2014; Adamson and Lalli 2021; Barrett 2022; Krige 2022). Our multi-author approach shows that multiple transnational frameworks, including South–South frameworks, spurred the globalization of science diplomacy. This expansion of the geographic scope and inclusivity of the science diplomacy landscape reveals the interconnected nexuses of power operating across diverse diplomatic, scientific, and political communities.

We identify five key features that appeared in different areas of science and diplomacy, all of which were fundamental to and characteristic of science diplomacy's global expansion. First, increasing multipolarity, stemming from the greater agency sought and felt by developing countries, changed the science diplomacy landscape just as it was transforming the global economy, energy supplies, and culture. Second, this agency was especially evident in the resistance newly independent countries exhibited in the technoscientific realm to the influence of former colonial powers and Cold War hegemonies. Third, international technocratic organizations were especially crucial in this expression of science diplomacy agency, either as forums for opposition and confrontation or, at times, as institutions to be deliberately avoided when UN orthodoxies and structures amplified traditional geopolitical power rather than subverting it. Fourth, global consensus proved unachievable even in areas of science seemingly ripe for it. Finally, the new constellations of science and diplomacy that came into existence in the early 1970s were composed of not only ambitious newly independent countries but also novel regional alliances.

None of this may seem at first particularly profound, but these features—multipolarity, resistance, and agency; lack of global consensus; regional alliances and interests; and the centrality of the UN system to the preservation of transnational science—still characterize the science diplomacy landscape of today (Gluckman et al. 2017). They all have their roots in and around 1970 in no small part because of the stage of decolonization the world had by then reached. In 1955, the year of the Bandung Conference of nonaligned states, the UN counted seventy-six countries (Bandyopadhyaya 1977; Lewis and Stolte 2019).[1] By 1970, UN membership had risen to 127 (UN 2022). In a UN system in which each country had one vote, this process of independence had the potential to shift power towards what Willy Brandt in the 1980s would term the Global South.[2] As we will see below, these recently independent states exercised new-found agency, pushing back against old hegemonies in technoscience and international affairs. If not as jarring as the unprecedented step taken by the Arab members of the Organization of Petroleum Exporting Countries to introduce an oil embargo against the USA and other countries that had supported Israel in the Arab-Israeli War, science diplomacy initiatives rooted in the Global South were also characteristic of the early 1970s (Bösch and Rüdiger 2014). It was this engagement of Global South countries in transnational science—especially within the UN system—that transformed science diplomacy into a global phenomenon.

Understanding the origins of the globalization of science in this fashion is more novel than it first appears. Scholars have noted how practitioner literature often places the appearance of 'global challenges' as the origin point for the globalization of science diplomacy (Rungius and Flink 2020). However, as Tim Flink has argued, this is historically inaccurate (Flink 2020). Rather, by the beginning of the 1970s, the increasingly numerous and diverse countries around the world that were clamouring for a more equitable distribution of scientific expertise and technological capacity induced this historical development (Secretary-General, U.N. 1977). The efforts of groups such as the Non-Aligned Movement, and more specifically the G77, have increasingly focused on the technoscientific agencies of the UN (Friedman and Williams 1978; Standke 2006). Their fight to find recognition within this system centred on science, which, in turn, elevated the place of science diplomacy in the other struggles of decolonialization, including seeking redress for economic disparities (Boleslaw 1984).

That said, transnational science and the globalization of science diplomacy in the 1970s were not just a matter of the increasing importance of the Global South or the strident concern many countries had with the issue of development. Rather, these latter phenomena set the stage for global science diplomacy. Our survey of science diplomacy's globalization in the early 1970s ranges across several areas of technoscience to better understand both this mode of globalization's origins and its nature. We find that in space technoscience, the multipolarity of technoscience evinced itself in both the emergence of important new programmes and alliance formation among established ones. Meanwhile, in ocean science, resistance to colonial and Cold War hegemonies shaped action in the UN and in regional alliance formation, even though those alliances proved brittle. Developments in the diplomacy of the environmental sciences underlined the failure of 'global challenges' to inspire unity and show the degree to which science diplomacy forums could become stages for fundamental debates. No contemporary observers would have thought the nuclear sciences a field for consensus, and they generally were not; however, by the early 1970s, many would agree that international treaties and the UN International Atomic Energy Agency (IAEA) had become central to continued developments in this field, either as the setting for transnational nuclear scientific actions and affairs or as stages to be deliberately avoided. Finally, our survey examines health and population diplomacy, where post-colonial sensitivities resulted in notable South–South collaboration and the formation of regional bodies to challenge the science of former colonial powers.

2. Multipolarity in space

The received narrative of space exploration during the Cold War is, with few exceptions, one of Superpower competition, centred on a bipolar race in which by 1970 the USA had pulled ahead of the Soviet Union (Siddiqi 2003; Sheehan 2007; Andrews and Siddiqi 2011; Wolfe 2013; Brown 2019; Launius 2019). In fact, what the historical record shows is that by that time the world of space science and technology was very much a multipolar one. Besides the US Apollo Program and continued Soviet efforts, other entrants were participating in the 'Space Race' with varying degrees of success, resulting in intriguing technoscientific and geopolitical constellations of relations and power.

The year 1970 witnessed the first successful attempts by Japan (February) and the People's Republic of China (PRC) (April) to launch artificial satellites. Japan's effort, Ohsumi, made it the first country in Asia to mark such a success.

China's first satellite, Dongfanghong 1, was equally portentous, as it signified the arrival of 'developing countries' (and the world's second socialist power) as active players in the space age. The *People's Daily* in the PRC as well as *Peking Review* magazine for overseas audiences proudly published schedules of the satellite's passage over major cities in the PRC and around the world (Peking Review 1970a,b; Rémin Ribào 1970a,b). Significantly, in a period of geopolitical realignment for the PRC, regional allies, friends in the socialist and developing worlds and even revolutionary groups like the Lao Patriotic Front relayed congratulatory messages.[3]

China's space-related ambitions were a source of anxiety in Washington, DC (Phillips 2006: Document 7). Nor given the surveillance implications of satellite technology were they seen as a positive development in USSR, a country who had clashed with China in violent skirmishes on the Sino-Soviet border the prior year (Solomone 2012; Li et al. 2017). The PRC's as well as Japan's successes suggested the degree to which the space technoscience panorama was becoming a multipolar one. Even if collective European efforts had encountered obstacles and failures, individual European countries like France (1965) had succeeded with their own launch devices, and several others had piggybacked on US launch platforms. In fact, it would become characteristic of the 1970s for new entrants like India and Czechoslovakia to do the same on Soviet rockets. While this suggests the continued technological prowess of the Superpowers, it also underlines the degree to which cooperation in space technoscience represented an important alliance-building opportunity in an increasingly multipolar world.

Both the USA and Soviet Union continued robotic (and, in the case of the USA, human) exploration of the Moon and inner planets. For the USA, space technoscience as planned in 1970 proved impossible because of the near-catastrophic accident on Apollo 13. NASA's tenacity and skill in seeing three astronauts safely returned could not mask the fact that Soviet space endeavours were more successful. That year, the Soviets launched several robotic probes, including Luna 17, which carried to the Moon the robotic rover Lunokhod 1, the first remotely controlled wheeled robot to land on another celestial body. It yielded data that could not have been obtained by any equivalent Western-constructed tool at the time, suggesting that the Apollo Program's triumph did not necessarily result in unadulterated US technoscientific superiority (Kassel 1971; Vinogradov et al. 1971; Launius and McCurdy 2008; Aronova 2017).

Furthermore, manned missions continued to play a prominent role in the public and interstate dimensions of Soviet space diplomacy. The figure of the cosmonaut was a powerful part of Soviet public diplomacy efforts, and this made the 'Interkosmos' programme even more significant in science diplomacy (Fedosejev et al. 1986; Rossošanskij 2011; Gerovitch 2015). 'Interkosmos' was the next step in the 'Work Programme for Joint Work in the Field of Exploration and Use of Outer Space for Peaceful Purposes' project launched in April 1967, aimed at involving cosmonauts from other countries in the Soviet sphere. In Eastern Europe, the programme was received with scepticism. Preliminary talks with participating states going back to 1965 suffered from structural issues and rigid bilateral arrangements rooted in the Soviet goal of maintaining control over the technological advances of Eastern Europe (Těšínská 2019). Nevertheless, eight years later, in 1978, under the Interkosmos banner, Czechoslovakia became the third state after the USA and USSR to witness a citizen in space (Právo 1978). Czechoslovak Vladimír Remek's participation in the Soyuz 28 mission was as much for inter-alliance maintenance as science. Many years before, Leonid Brezhnev had promised the Czechoslovak premier Gustáv Husák that the first cosmonaut from the wider Soviet Bloc would come from Czechoslovakia to deter resentment over the 1968 invasion.[4]

The year 1970 also foreshadowed the future of space technoscience in which collaborative missions stole the limelight, such as Apollo-Soryuz programme, opening talks for which took place in Moscow in October 1970. Throughout the early 1970s, the European Space Agency would enter negotiations to build a 'Spacelab' experimental platform component for the US Space Shuttle missions of the 1980s. In the 1980s, via Interkosmos, Jean-Loup Chrétien would become the first Frenchman in space (June 1982) and Rakesh Sharma the first Indian (April 1984). In other words, today's space technoscience, with its sometimes-fraught cooperation at the International Space Station and headline-grabbing missions launched by the likes of the PRC and India, reflects a process of globalization that became visible in the 1970s.

3. Resistance in the oceans

Increasing globalization in ocean science diplomacy, while exhibiting the multipolarity and alliance building visible in space technoscience, involved a different major theme: developing nations visibly sought to challenge the hegemony of the USA and other major Western powers (Robinson 2020). This challenge went hand in hand with a wider diplomatic effort on the part of developing countries to assert themselves in world forums, especially the UN and its agencies. However, the scientific and technical arena took on a political character as technoscience—the ocean sciences included—became a measure of a nation's 'development' while serving as a cause for widening global inequalities. Complex, sometimes paradoxical, ocean science diplomacy came to define international relations in the 1970s and reshape the international law of the sea.

Of immediate diplomatic concern was the opening of the UN-led International Decade of Ocean Exploration (IDOE, 1971–80), the last preparations for which were being made in 1970. By all appearances, the IDOE projects emphasized inclusion and cooperation. All programmes were to be multinational and peaceful, involve international cooperation, and have relevant data submitted to World Data Centers (IOC 1973). In principle, the IDOE was intended to be a movement away from earlier expeditions that had prioritized focused research, usually among Western nations, in clearly defined parts of the global ocean (Brenner 1975). These earlier endeavours, such as those during the International Geophysical Year (1957–8) and the International Indian Ocean Expedition (1962–7), had relied heavily on US funds, used vessels, and scientists from Western oceanographic powers and done little to build local research capacities or invite local scientists on board (Hamblin 2005). While US President Lyndon Johnson claimed in 1966 that 'a new form of colonial competition among the maritime nations' should be carefully avoided, developing countries came to perceive serious risk in the heralded oceanic age to come (Johnson 1966).

That the IDOE fell under the auspices of the UN was not enough to suppress the suspicion of a neo-imperial project. Scientific agencies of less-developed countries doubted the IDOE's real intentions, and, unlike the oceanographic powers interested in the deep oceans, most Asian, Latin American, and African participants wished to assess the seabed close to shore, where they might reasonably expect to develop viable extractive industries (Brenner 1975). For instance, Brazil's decision in 1970 to expand its territorial seas' exclusive economic zone from 12 to 200 miles kept foreign fishing vessels away from its coasts and safeguarded its ocean resources, while also highlighting its selective approach to international ocean collaborations (Morris 1979). For ocean science, tensions were increasingly visible when it came to defining geographic research areas, selecting collaboration participants, and distinguishing applied, economically relevant research from basic research—not to mention questions of capacity building, education, and technology transfer from developed to developing nations.

One endeavour that demonstrated the exclusive nature of Western-dominated ocean science was the US-led Deep-Sea Drilling Project (DSDP) launched in 1968. Aiming to chart the geological make-up of the seabed from hundreds of drill core samples, the DSDP marked a collaboration between US company Global Marine Inc, the US National Science Foundation, and the Scripps Institute of Oceanography, a public–private partnership (Ryan et al. 1973; Hsü 1987). It was a project with global ambitions, albeit with highly selective global partners (Hsü 1992). While addressing pressing scientific questions such as how to furnish empirical proof for the theory of plate tectonics, it was equally useful in assessing the potential of seabed mineral extraction and identifying where such riches lay. This made the DSDP's intertwining of public science and private industry appear suspicious to those countries excluded from the project. To them, the project appeared to be aimed at establishing a deep-sea mining enterprise that would deliver a select group of nations a monopoly within the ocean economy (Mero 1965; Payne 1978; Payne and Nassar 1982; Van Keuren 2004).

To challenge Western hegemony and chart a new course in ocean science among the nations of the Global South, the UN Economic Commission for Asia and the Far East (ECAFE) initiated in 1970 a geophysical survey in the Yellow Sea and the East China Sea (EACFE 1970). The expedition, while composed solely of countries sympathetic to the Western bloc, kept out the oceanographic powers like the USA, the UK, and France. The survey soon caused a sensation when it reported the discovery of hydrocarbons. Instantly, the geopolitical tensions lying behind the open goal of conducting marine studies surfaced (Ma 1984). The South Korean government announced a 'marine resource law' laying claim to the continental shelf and its mineral resources. The Republic of China (Taiwan) responded with similar legislation, and Japan encouraged its domestic oil firms to start their own drilling. In other words, a transnational oceanographic effort triggered unilateral protectionist legislation and policies (Maeilgyŏngje 1970: 1; United Nations 1981). Even the PRC entered the fray, responding with fury to a Taiwanese attempt to save the collaborative intentions of the ECAFE survey, which had originally proposed a joint exploration by East Asian nations (Peking Review 1971: 14–5; Renmin ribao 1971: 5). Even in a research project subverting the hegemony of the maritime powers, once resources were discovered in the ocean depths, the same diplomatic challenges of competition emerged.

Ultimately, the UN organization could not prevent conflict between various contenders seeking appropriate marine resources (Robinson 2020). The rhetoric of peaceful international oceanography notwithstanding, transnational oceanographic projects tended to upset the scientific cooperation they set in motion by unearthing new pools of strategic economic resources (Buzan 1976; Locher 2020). While cooperation among like-minded countries with emerging oceanographic capacities was necessary to counter the scientific dominance of the leading technoscientific powers, rivalry over newly discovered resources tended to trump any effort to work together. While by 1970, the UN's voting system favoured the increasingly numerous recently independent countries, the reality of technoscientific cooperation in the oceans was one of the best limited cooperation and constant tensions over global resources.

4. Global concerns without consensus in environmental diplomacy

The year 1970 marked the coming of age of 'environmental diplomacy', but global harmony in the international environmental sciences proved as elusive as in ocean research and space technoscience (Flippen 2008). Concern for the Earth's environment had the potential to create a global consensus around efforts to monitor environmental degradation and gave new reasons to negotiate international scientific collaborations. However, environmental diplomacy equally entailed the instrumental use of environmental projects and related collaborative research to administer—and at times to reshape—international relations. While the advocacy for evidence-based environmental actions fostered global monitoring projects, it also deliberately evaded underlying global issues, such as development, inequality, and power imbalances. In other words, in 1970, environmental diplomacy in a multipolar world could not arrive at a common understanding of how to define either 'global' or 'concern', although the new environmental movement suggested that both were possible.

An initiative originating in the USA suggested an approach to environmental diplomacy. In July 1970, MIT management professor Carroll Wilson assembled a group of sixty-eight scientists in the context of the so-called Study of Critical Environmental Problems (SCEP), ultimately producing *Man's Impact on the Global Environment* (1970). Focusing exclusively on environmental issues that were global in scope, such as fossil fuel consumption, supersonic travel's impact on the ozone layer, and the ecological impacts of fertilizers, the SCEP study emphasized, in a technocratic fashion, the need for further research, the collection of more data, and the establishment of international systems for global monitoring (SCEP 1970). This model of environmental interventions reflected how US diplomats wished to reconfigure relations with allies, as within the North Atlantic Treaty Organization (NATO), where a new committee promoted the tackling of environmental problems through research on air and water pollutants (Turchetti 2019).

However, the NATO effort was restricted to Treaty member states, and the tensions inherent in environmental diplomacy only became apparent at the UN Conference on Human Environment in Stockholm two years later. Cold War rivalries revealed themselves when the Soviet Union boycotted much of the meeting in protest at the omission of East Germany from the list of participating countries. US delegates, too, threatened to leave the talks when Swedish delegates inserted language into a resolution that called for the denunciation of 'ecocide', an implicit reference to the use of Agent Orange in Vietnam. More significantly, still, at the end of the proceedings, Indira Gandhi issued a blistering critique of the entire meeting, arguing that poverty was a major factor in the production of pollution and thus constituted the greatest of environmental problems (Macekura 2015: 113–5; Warde et al. 2018). This radical critique demonstrated the limits of the US technocratic approach to global monitoring and mitigation, as well as the strength of feeling and opposition to technopolitical solutions handed down from industrialized nations emanating from the Global South.

Sweden's own positioning on the matter demonstrates the discomfort Gandhi's criticism created. While its willingness to host the UN Environmental Conference amplified the perception of Sweden as an environmentally-friendly country, it was at least in part a means of boosting Sweden's remote sensing capability, thus increasing Sweden's capacity building in national space research and global surveillance projects (Gärdebo 2019: 82–4). Mixed motives like these lay behind the failure of Gandhi's criticism to lead to a revision of the conclusions reached by the UN Environmental Conference. Instead, the conference combined Swedish and US diplomatic aspirations to make greater use of remote sensing techniques to enact the global monitoring scheme advocated by the SCEP study.

The tensions that inhibited a singular, global approach to the environmental sciences were also visible in South Pole diplomacy. There, science and environmentalism were mobilized to strengthen the 1961 Antarctic Treaty (AT) system. The AT represented a fragile compromise between the two Superpowers as well as those nations staking sovereignty claims on portions of Antarctic land. The former were eager to use the continent—like space and the oceans—as another arena for their scientific and technological race. As of 1970, collaborative polar research efforts are yet to grant the diplomacy returns needed to fortify the AT, and in some circumstances, they even elicited doubts about their true ambitions, especially in South American states such as Chile and Argentina, who were Treaty members and yet often kept out of large collaborative endeavours. Over the course of the 1960s, negotiators succeeded in reaching several conventions for the conservation of Antarctic plants and animals, but the AT system failed with more complex issues such as fish stocks in Antarctic waters and the exploitation of marine resources (Howkins 2017; Antonello 2019). Therefore, by 1970, while environmental concerns appeared to herald an opportunity for global consensus in a novel, new area of science diplomacy, in reality, consensus proved elusive, as monitoring techniques tended to be too readily associated with national interests, and more radical readings of the origin of human-caused environmental degradation split various blocs of countries.

5. Nuclear networks inside and outside the IAEA

Nuclear technoscience and its circulation in 1970 reveal the same emerging multipolarity as in space technoscience and environmental diplomacy. Furthermore, in nuclear technoscience, the UN and, in particular, the UN agency, the IAEA, took on a central role. The diplomacy of nuclear technoscience was shaped by the reduction in tensions in the nuclear standoff between the Superpowers. The IAEA became a terrain of relative agreement, and the Nuclear Non-Proliferation Treaty (NPT) served the Superpowers' common purpose of limiting nuclear proliferation and cementing their positions as nuclear-weapons hegemons. Hence, through cooperation on the peaceful applications of atomic energy in both blocs and their cooperative efforts to limit proliferation, the USA and USSR sought to maintain their positions as Cold War bloc leaders (Brands 2007; Gavin 2010).

The growing complexity of the global nuclear order, however, was transforming the circulation of nuclear technoscience into an increasingly competitive, multipolar system. New fault lines and areas of competition appeared. Tensions between developing countries and those already possessing nuclear industries grew in significance (Nuti 2018; Bracken 2021). These tensions underlined the existing asymmetry. The nuclear powers' championing of non-proliferation rested on an unequal understanding of nuclear security, one that suggested that only they could safely possess a nuclear deterrent (Gusterson 1999). This posture intensified the conviction in certain countries that they too should acquire nuclear weapons. Argentina, Brazil, India, and Pakistan, among others, rejected adherence to the NPT and were actively anti-NPT (de Araújo Castro 1982).

Asymmetry of power could also be observed in access to nuclear energy. Nuclear power plants were built by and located almost exclusively in the Superpowers' territory, the former colonial powers, and a few other highly industrialized economies. Almost none existed in the developing countries, and although a handful was under construction, e.g. in Argentina, a disproportionate number of planned atomic reactors were to appear in the Global North. While the IAEA Director General Sigvard Eklund claimed that the spread of nuclear power would only increase 'the gap between the advanced and the developing countries' (IAEA Bulletin 1970) and historical analyses since suggest nuclear power's negative impact on energy and economy (Edgerton 2011), there was a visible enthusiasm for nuclear programmes in the newly independent countries, e.g. Ghana's efforts to cultivate exchanges with multiple countries (including the USSR) as well as with the IAEA (Osseo-Asare 2019).

The IAEA presented itself as centre to lessening the asymmetries of nuclear technoscience and demonstrated the central role UN agencies could play in science diplomacy. The IAEA's statutory basis for technical assistance sanctioned an orderly, global diffusion of nuclear techniques for peaceful uses. In the first eleven months of 1970, 138 experts and eleven visiting professors carried out missions to over sixty countries, eleven regional and inter-regional training courses were organized, and 354 fellowships for individual study were awarded in fields ranging from use of radioisotopes in agriculture, food preparation, industry, hydrology, and medicine to prospecting for raw materials and basic nuclear science and teaching.

However, the nuclear technoscience powers funding this diffusion were parsimonious. In 1970, the amount of aid provided was disappointing, as the voluntary pledges called for always came up short. The target for 1970 was USD 2 million, only 85 per cent of which was filled (IAEA Bulletin 1971; Roehrlich 2022). Furthermore, IAEA assistance competed with other established aid programmes, such as the bilateral agreements reached by the USA or USSR and respective recipient countries, in ways meant to maximize political gain for the donors (Hamblin 2021).

Nuclear infrastructure in the parts of the world without it required more than what the IAEA could supply. US red tape and Soviet caution also limited what ambitious countries could expect. Nuclear proliferation was nevertheless unfolding globally. By 1970, the PRC and France had tested hydrogen weapons, further manifesting their independence from the USA and USSR. There was growing awareness in Washington, DC, as well as Moscow and Vienna, of networks propelling the circulation of nuclear technoscience on the quiet. Rumours flourished about the contacts of Norwegian, British, and French atomic programmes with Israel. Meanwhile, US officials were struggling to prevent the reopening of Brazil's atomic relations with third parties, something they had masterfully succeeded in snuffing out during the 1950s. In the 1970s, they would fail, and a Brazil–West German agreement was signed in 1975 (Patti and Spektor 2020; Adamson and Turchetti 2021). South Africa's apartheid regime was pursuing uranium enrichment, and its programme could thrive thanks to assistance from Pakistani scientists and engineers trained in Europe (Chaudhri 2006). Its connections with Israel were hinted at nine years later with a mysterious nuclear flash above the skies of the Indian Ocean (Cohen and Burr 2006). Similarly, Pakistan bettered its own nuclear capacity in 1970 with the completion of the Karachi Nuclear Power Plant (Kanupp1), a Canadian-designed heavy-water moderated 137-MW reactor. Significantly, up to that point, Pakistan's efforts to acquire nuclear technology had been linked largely to Atoms for Peace and IAEA, but as the 1970s unfolded, and especially after India manifested its superiority with its first test in 1974 (allegedly a 'peaceful nuclear explosion'), Pakistan pursued other transnational channels to attain nuclear technology (Khan 2012).

So, even as publication data on nuclear science and technology became centralized in the IAEA via the International Nuclear Information System (which began to operate in 1970), countries ambitious to increase their capacities in the nuclear field often chose other channels to acquire the technology. Paradoxically, their efforts to subvert the power of the IAEA underlined the importance of the UN agency as the central establishment node for nuclear technoscience. Nuclear science diplomacy in the 1970s, carried out in an increasingly complex, multipoint global landscape, pivoted on debates of what was at stake in the IAEA, as well as on the transnational flows of information and technology outside it.

6. Health, population, and regional specificity

Of all areas of science diplomacy, health appeared to have the greatest potential in 1970 for universal, even humanitarian global appeal (Kickbusch and Ilvanova 2013).[5] After all, health practices and population trends tangibly affect the everyday lives of people, while simultaneously shaping national economies, regional politics, and international diplomacy. However, efforts to limit population as a part of health and social policy during the 1970s were by no means universally accepted but locally questioned and contested. Criticism mounted that transnational and diplomatic efforts to curb population growth via family planning, integrated into the development aid programme, neglected the culture and welfare of the programme's local recipients (Connelly 2008: 309–39; Packard 2016: 215–25). Attempts to forge a new health diplomacy were seen at times as an imposition of neo-colonial hegemony and at other times as the manifestation of new, alternative regional constellations of interest and power. Rather than offering straightforward models, health and population diplomacy demonstrates historically the limits of a simple neo-colonial framework for understanding global science diplomacy and the importance that varying notions of 'development' had on how new networks were shaped.

By 1970, in the domain of population, the World Health Organization (WHO), the international UN organization for health, and other UN organizations that had previously been considered marginal began to play a significant role (World Health Organization 1971, 83). The WHO, in particular, was becoming a forum for bridging Cold War East-West divides and achieving globally welcomed initiatives, such as the prevention of pneumoconiosis (Alois 1998). At the same time, non-governmental organizations, such as the International Planned Parenthood Federation and Population Council, Inc, were important in setting an agenda for international discussion on the role of population in socioeconomic development and health. Finally, inter-regional diplomacy rooted in a post-colonial development agenda began to outweigh Cold War rivalry in terms of agenda setting.

An example of the latter was the Asian Parasite Control Organization (APCO), a non-governmental organization established in 1974 to promote the 'Integration Project' (IP), a health initiative combining parasite control and family planning. The APCO's family planning programme was informed by the Cold War politics, in particular, the US efforts to secure 'free world' alliances (DiMoia 2008; Huang 2016; Lin 2019). But inter-regional health diplomacy was also based on the unique ways in which the region's historical specificity mapped onto the inter- and transnational diplomacy. In the case of the APCO, it was mobilized by the transnational idea of 'Asia's population explosion' that relied on the network and interactions among Asian actors who were firmly embedded in the legacy of colonialism and war in East Asia (Homei and DiMoia 2021).

The foundation of APCO took advantage of the existing ties with South Korean parasitologists and Taiwanese health specialists, a legacy of the years of Japan's colonial rule in these regions. Furthermore, APCO's activities in Indonesia, for instance, were in part driven by the Japanese war reparation agenda. These regionally specific historical conditions contributed to the inter-Asian response to the transnational population control movement. The 1970s then witnessed the spread of these regionally based activities to countries in Latin America and Africa, as well as in communist PRC, to the extent that the UN Population Fund awarded its contribution to the global effort to tackle population issues (Homei 2016).

In other words, in 1970, at the historical moment when science diplomacy was becoming a global phenomenon, health and population diplomacy was notably multi-dimensional. On the one hand, it was informed by the perpetuating Cold War rhetoric that insisted on the ideological divide between Eastern and Western blocs. But, on the other hand, during this period, transnational and trans-ideological interactions came to shape medico-scientific and health practices unfolding in the domain of diplomacy. The call for 'health for all' in international health politics implied more transnational negotiation among various actors, from both the Global North and South, further decentring the Cold War as a factor shaping national, regional, and global exchanges in health-related activities (Lin and Birn 2021/2). Yet, while this call carried the air of equality, health diplomacy in the 1970s hardly took place on an equal ground. It was shaped by both locally specific and global hierarchical power relations among the actors, which stemmed from the pre-war colonial power structures.

7. Conclusion: mapping Global Science Diplomacy in the global decade

In the end, the globalization of science diplomacy evidenced itself not only in the numerous novel initiatives driven by state interests and international institutions but also in the rise of grass-root transnational networks among scientists, especially radical scientists. Such a group of scientists at the 1970 meeting of the International School of Physics 'Enrico Fermi' in Varenna on Lake Como (Italy) produced a manifesto reproaching the scientific world for generating stifling consensus and maintaining repressive social structures (D'Espagnat 1971). This followed in the wake of similar critical manifestos distributed by US and British scientists and paved the way for a similar collective document decrying the role of science in prosecuting the Vietnam War (Buzan 1976: 95; Vitale 1976; Turchetti 2016; Bharucha 2018).

This transnational protest among a wide group of scientists, as well as the evident globalization of science diplomacy, including initiatives in some Global South countries to favour South–South connections in lieu of ones that led to technological dependency on the Global North, coincided in the American context with US planners and strategists' moves towards a more reflective, strategic approach to science diplomacy in a more complex, multi-agent environment (Gaillard 1994; Sant'anna 2013; Lüthi 2016). In 1970, US congressman Clement J. Zablocki pushed for the establishment of the National Security Policy and Scientific Developments subcommittee of the House of Representatives, from which commenced the 'Science, Technology, and American Diplomacy' project. This study led to the reform of the US State Department, including reorganization of the State Department's Science and Technology Office into the Bureau of Oceans and International Environmental and Scientific Affairs, employing nearly 100 specialists by the middle of the decade (Zablocki 1970).[6] It was a recognition in US policy circles that the globalization of science diplomacy was a long-term concern requiring a dedicated effort to study the phenomenon and understand its global extent.

So, in effect, the present survey attempts the same, but with an important qualification: such an effort to map out science diplomacy in and after 1970 requires multiple examples, multiple narrative origin points, and, ultimately, multiple researchers, each bringing different sources to the project. Our own effort leads us to conclude that the underlying condition of this historic globalization was the increasing importance of the Global South in science diplomacy. In this, there was consternation, even disruption, for hegemonic powers. But the political assumptions that had shaped the collaborative programmes from the 1950s could not hold. The emerging multipolar reality of international science and technology meant adjusted strategies for Cold War Superpowers, European interests, and the socialist world and new if tenuous opportunities were present for recently independent countries. As historians, we look forward to the new sources and stories to come that will further illustrate the development of global science diplomacy in the decade of globalization.

Data availability

All materials analysed in this paper are in the public domain.

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Notes

1. In their analysis, Su Lin Lewis and Carolien Stolte treat the 1955 Bandung conference as the 'great event' and demonstrate that many alternative linkages between non-aligned Asian and African countries also took place around that time (Lewis and Stolte 2019). But it was only in 1976 that the non-aligned countries transformed themselves into the non-aligned 'movement' (Bandyopadhyaya 1977).
2. Thus, the Global South to which we refer in this article can be thought of as first defined by West German Chancellor Willy Brandt's Independent Commission on International Development Issues in its report *North-South: A Programme for Survival* (1980). This report defined by means of the so-called 'Brandt line' the geographical divide between developed and developing states. The 'line' separating North and South runs along the US–Mexico border before skirting through the Mediterranean, passing south of Turkey and the central Asian states, then part of the USSR, and north of India, Nepal, Mongolia, China, before turning South to skirt Japan, and to leave out Australia and New Zealand.
3. See, e.g., notes of congratulations in the 30 April and 8 May 1970 issues of *Peking Review*.
4. This was revealed by former Prime Minister and President of Poland Wojciech Jaruzelski, in 'Mít pořádek jako v Československu: rozhovor s generálem Wojciechem Jaruzelským o Husákovi, o srpnu 1968 a o kosmonautech ['To reach the same order as in Czechoslovakia: Interview with general Wojciech Jaruzelski about Husák, August 1968 and cosmonauts'] (2004) *Dějiny a současnost* [Past and Presence] 26/4: 10, see also Štrbáňová and Kostlán (2011).
5. Key literature on how health became a subject of international diplomacy includes *The World Health Organization: A History* by Cueto et al. (2019), *A History of Global Health: Interventions into the Lives of Other Peoples* by Packard (2016), and *Reimagining Global Health: An Introduction* by Farmer et al. (2013).
6. In turn, a new research unit was set up at the US Library of Congress to provide the documentation needed by Zablocki's subcommittee. The division published various reports including *Toward a Mew Diplomacy in a Scientific Age* by LOCSPRD (1970) and *Science and Technology in the Department of State bringing Technical Content into Diplomatic Policy and Operations* by LOCSPRD (1975).

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