

Science Diplomacy: An Overview in the Global and National Context

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Abstract

Science Diplomacy seeks avenues for strengthening humanity and consolidating the existing international relationships through academic and industrial collaboration between nations on various scientific and technological frontiers. Science and technology are effective tools for addressing global challenges and cross-boundary disputes amicably by promoting international scientific collaboration to harness the potentials of partner countries. In this perspective, we revisit the global developments in science diplomacy and with a particular focus on Nepal, we explore how science diplomacy has been vital for establishing scientific collaborations. The paper also highlights the effort and the role played by the Nepali diaspora for enhancing scientific collaboration and technology transfer between Nepal and the scientifically advanced nations. While further strengthening diplomatic ties that Nepal currently enjoys with friends worldwide, we discuss various policy measures that can leverage scientific output in the country by encompassing scientific and technological collaboration as an integral part of foreign policy. We believe that this paper can also serve as a useful reference to achieve Sustainable Development Goals and combat global challenges such as climate change, natural disasters, and pandemics through science diplomacy and cooperation.

Keywords

Foreign policy, Nepali diaspora, Pandemic, Soft diplomacy, Sustainable Development Goals

Introduction

The rapid progress made in science and technology has redefined the concept of classical diplomacy by integration of scientific minds and agendas in the diplomatic spheres (Ahmed et al., 2021; Sterling, 2018). Acting as a critical link between track one and track two diplomacy, science diplomacy speaks a universal, neutral, and apolitical language supported by evidence. It is an important component of soft diplomacy as it can amicably leverage collaboration and even connect transnational political players with different political ideologies, or countries with different socioeconomic profiles (Johny, 2018). Since people tend to trust scientists more than politicians (International Science Survey, 2019-2020), it is inevitable for political

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diplomacy and science diplomacy to act in concert to achieve result-oriented solutions. Science informed political diplomacy that integrates all three components of science diplomacy – namely science for diplomacy, diplomacy for science and science in diplomacy – has become the key strategy for all the economically advanced nations for attaining economic prosperity.

Science based soft diplomacy has been instrumental in easing political tensions and has led to landmark events and initiation of international research centers. Even when nations were in the state of tension during cold war period, science has acted to connect those nations despite the growing political rifts and tensions. In the 1970s when the United States of America (USA) and Soviet Union were in the state of cold war, the initiation of scientific collaboration for space exploration in the name of Apollo-Soyuz Test Project had a far-reaching implication on the humanitarian ground in addition to the scientific mission, as it greatly eased the political tension and brought Americans and Soviet Union citizens closer (Krasnyak, 2018). Subsequently, this collaboration also became instrumental in the establishment of the International Space station. Similarly, after the conclusion of the second world war, the European Organization for Nuclear Research (CERN) was established in 1954 by 12 European countries to promote science collaboration and international peace.

Scientifically advanced and economically well-off countries have made several active efforts to integrate science as a part of diplomacy. In Japan, the Ministry of Foreign Affairs has formed an advisory board for the promotion of science and technology diplomacy since 2015 to aid the government in facilitating science and technology diplomacy both bilateral and multilateral. Similarly, to increase the visibility of German science, innovation and scientists, the German government initiated the German Centers for Research and Innovation (DWIH) with offices in New York, Sao Paulo, Moscow, New Delhi, and Tokyo. The Federal Foreign Office has been supporting the DWIH centers placed in strategic locations. Some countries have rightly realized the importance of technology-based industries in shaping diplomatic decisions between nations. For example, under the umbrella of the Ministry of Foreign Affairs, the office of the tech ambassador of Denmark has a tech ambassador along with its offices and TechPlomacy team in Silicon Valley, California, Copenhagen, and Beijing (Klynge et al., 2020). Moreover, in the current era where there is a global hunt for talent, advanced nations have eased border entry requirements, visa regulations and permanent residency criteria for academicians, including scientists. Further, non-state actors such as universities, academies and non-profit organizations have also played a critical role in promoting awareness and advocating the integration of the scientific domain as a critical component of political diplomacy. One such effort is the magazine *Science and Diplomacy* published by the American Association for the Advancement of Sciences. Similarly, The World Academy of Sciences (TWAS), a platform for promoting scientific research and sustainable development in the developing countries, and The Global Young Academy, an international consortium of young scientists, also conduct workshops and seminars on science diplomacy. Universities are also a vital component for advocating science diplomacy through seminars, conferences, and formal teaching programs.

Science diplomacy is indispensable for achieving the 2030 roadmap for sustainable development and the targets set by the 17 Sustainable Development Goals (SDGs) (Shrestha, 2021). The United Nations believes that the interaction between science and policy is necessary to accelerate the progress made so far in achieving the SDGs. Strengthening the science-policy interface has been the key role of the high-level political forum (HLPF) on sustainable development, a body formed to follow-up and review the progress made for the 2030 agenda. Similarly, the scientific advisory board of the UN Secretary General and important global summits such as the Rio+20 summit of the head of the states and ministers stressed on the need to enhance science-policy interface for evidence-based decision making for sustainable development. Scientific knowledge is essential for understanding the technology used for biological warfare and weapons of mass destruction. However, it is only through the means of science diplomacy that nations can achieve peace and security. Similarly, equitable access to technology is required to achieve sustainable development by increasing life expectancy, decreasing infant mortality, reducing carbon dioxide (CO₂) emissions, and for planned urbanization. The rapid explosion of scientific technologies has led to accumulation of huge amounts of data. Sharing big data for scientific research and making it available to scientists and policymakers globally to achieve sustainable societies, is an important aspect of data diplomacy.

This article aims to depict the status and the scope of science diplomacy in Nepal.

Method

This article dissects the status of the science diplomacy in Nepal, largely by using qualitative information obtained from various sources including academic literature, government websites, expert opinion, and from online news portals. A comparison of Nepal's current standing in science diplomacy, the secondary data and information suggest that the country has yet to make a substantive progress in assimilating science diplomacy in its foreign policy. This article suggests that Nepal must reorient its traditional diplomacy by including science and technology as a crucial component of soft diplomacy and capitalize on the expertise of Nepali academicians based in Nepal or abroad.

Discussion

Science Diplomacy in SAARC Region

Albeit slow, the South Asian Association for Regional Cooperation (SAARC) as an institution has made efforts in the direction of science diplomacy. The establishment of the Center for Science and Technology of the Non-Aligned and Other Developing Countries (NAM S&T Centre) in New Delhi in 1989, is one of the first steps towards promoting science diplomacy along the member states of the non-aligned movement. So far, 47 developing countries have taken membership of the NAM S&T centre (NAM S&T Centre, 2022). The centre conducts international seminars, training workshops and collaborative projects on scientific issues

that are pertinent to developing countries. Headquartered in Nepal, the International Centre for Integrated Mountain Development (ICIMOD) – an inter-governmental organization of eight countries in Hindu Kush Himalaya (HKH) region – can also be taken as a successful example of science diplomacy at the regional level (Amadei, 2019). As high Himalayas suffer tremendously from the impact of the climate change, ICIMOD has a pivotal role for advocating for change in the context of climate diplomacy. The recent HKH Ministerial Mountain Summit 2020 is an example of ICIMOD's effort to protect mountain ecosystem through science diplomacy (ICIMOD, 2020). The ministers from all eight member countries had signed a historical declaration to protect mountain ecosystem and improve the livelihoods of people in the HKH region.

The Colombo Plan is another excellent example of how South Asian nations came to a political consensus to shape the development of human resources in the region. With its headquarters in Colombo, Sri Lanka, The Colombo Plan was launched in 1951 by seven commonwealth nations (Australia, Canada, Ceylon (now Sri Lanka), Great Britain, India, New Zealand, and Pakistan) with an aim of socio-economic development in the Asia and Pacific region through capacity building. Experts have also argued that Colombo plan was a part of strategic foreign policy by the commonwealth nations to fight against the increasing influence of communism in the Asian countries in the 1950s (Oakman, 2010). Whatever its motives, the Colombo Plan has now grown into an inter-governmental organization of 27 nations and has played an instrumental role in human resource development in the SAARC region. Several politicians, bureaucrats, and academicians in South Asia have received scholarships for university education through the Colombo Plan. As several policymakers in the SAARC region have befriended each other from their university days under Colombo Plan scholarship, this also helped to some degree to increase mutual understanding and co-operation in political decisions. Although in the early years the Colombo Plan scholarship supported education programs (typically university level) that lasted for a couple of years, it now appears that most of the fellowships for training programs are awarded for the short-term, typically for a couple of weeks or months. In addition to the Colombo Plan, the establishment of South Asian University in 2010 is another important milestone in the direction of science diplomacy in the SAARC region.

Status of Science Diplomacy in Nepal

Nepal's diplomacy has primarily focused on infrastructure development and economic diplomacy. The political diplomacy of Nepal suffers from challenges such as lack of political consensus among political parties, lack of agreement on identification of national interests, and lack of institutional strength (K.C. and Pandey, 2018). Although the Foreign Policy of Nepal, 2077 does mention strengthening and incorporation of technology transfer as a priority component of economic diplomacy; very few concrete efforts have been undertaken to materialize this. Of the financial assistance and grants that Nepal receives from international donor agencies, the funds for scientific research sectors have been absolutely minimal. Similarly, despite of the huge potential of developing indigenous technology, Nepal has been unable to commercialize such technologies globally.

Nepal does have some notable points in science diplomacy. For example, Pyramid International laboratory located at an altitude of 5050 meters in Khumbu Valley in Sagarmatha National Park was established in 1990 as a collaboration between the Italian government and Nepal Academy of Science and Technology (NAST). Many prominent international research papers have been published using this facility. The NepaliSat-1 nanosatellite developed by two Nepali students at the Kyushu Institute of Technology (Kyutech) in Japan in collaboration with NAST can also be taken as another good example of science diplomacy. The Nepal government funded the cost incurred for developing the satellite and NAST coordinated the project. The satellite weighing 1.3 kilos was imprinted with Nepal's flag along with the logos of the collaborating institutions, namely NAST and Kyutech. The ground station constructed at the NAST premises receives signals from NepaliSat-1. Although the NepaliSat-1 nanosatellite is not suitable for undertaking advanced research projects, its development can still be taken as a foundation for the development of advanced satellites in future. The importance of NepaliSat-1 can also be realized from the tweet of the then Prime Minister Mr. KP Sharma Oli: "Though a humble beginning, with the launching of NepaliSat-1 Nepal has entered the Space-Era. I wish to congratulate all those scientists and institutions that were involved right from the development to its launching thereby enhancing the prestige of our country." Similarly, the high-level visit of the then Minister for Education, Science and Technology, Mr. Giriraj Mani Pokharel and the vice-chancellor of NAST, Dr. Sunil Babu Shrestha to the Japan Aerospace Exploration Agency (JAXA) in June 2019 to attend the live video conference of NepaliSat-1 rotating in the orbit can also be taken as a science diplomacy related activity to further strengthen the excellent diplomatic relations between Nepal and Japan. During their visit to Japan, the Minister and the vice-chancellor of NAST also met with several notable academicians and administrators of Japanese Government research institutions. One was a meeting with the vice-president of National Institute of Material Science (NIMS). The meeting paved the way for the conclusion of the Memorandum of Understanding (MOU) between NIMS and the NAST. The vice-chancellor of NAST and the Deputy Chief of Mission (DCM) of Nepalese Embassy in Tokyo together had a meeting with the President and the high-level officers of Japan Society for the Promotion of Science (JSPS) to discuss future collaboration. In addition to the NepaliSat-1 project, other initiatives by NAST such as the Flora project, 6U project, and establishment of an Information Access Center (IAC) in the NAST premises with support of the Official Development Assistance (ODA) from South Korea are other aspects of science diplomacy. In addition, NAST also organizes knowledge exchange symposia with the foreign and Nepali experts and has MOU with the prominent international organizations such as the Center for Science and Technology of the non-aligned and other developing countries (NAM S&T center), The Association of Academies and Societies of Sciences in Asia (AASSA), Non-resident Nepali Association (NRNA), University of Hawaii, USA, Fujian Agriculture and Forestry University, China; and CITYNET, Japan, which are also activities that contribute towards science diplomacy.

Nepal's Vaccine Diplomacy During COVID-19

The Corona virus disease (Covid-19) has sent a strong message that science and knowledge cannot be limited within a confined geographical boundary. Another message is that “the sciences are never at war”, as rightly put by the British Physician Edward Jenner (Varshney and Prasanna, 2021). The formation of Global Alliance for Vaccine and Immunization (GAVI) in 2000, Coalition for Epidemic Preparedness Innovations (CEPI) in 2016 and Covid-19 Vaccines Global Access (COVAX) initiatives in 2020 suggest that the world can stand united at times of need to provide fair and equitable access to vaccines to all the nations, irrespective of their economic power (Singh and Chattu, 2021). Although Nepal benefitted from these initiatives, it had a relatively weak standing in terms of the vaccine diplomacy. It appeared that most of the high-level government committees for Covid-19 response were dominated by physicians rather than biomedical researchers and scientists. It is believed that the Covid-19 pandemic would not have been as bad had there been representation of scientists in the Covid-19 response arrangements at different ministries.

Nepal's excellent diplomatic relationship with its immediate neighbors India and China, and their strategies for vaccine diplomacy (Lee, 2021) worked in Nepal's favor for acquiring Covid-19 vaccines. Covishield, manufactured by the Serum Institute of India in collaboration with the University of Oxford and the AstraZeneca, and the Vero Cell vaccine, manufactured by the Chinese state-owned enterprise located in Beijing, were one of the first vaccines to receive approval from the World Health Organization (WHO). Both vaccines could be accommodated in the existing storage and cold chain transport capacities of economically underdeveloped countries as well. These technical factors coupled with effective vaccine diplomacy of both India and China proved to be a boon to Nepal in fulfilling its unmet and desperate need for vaccines. However, owing to its relatively poor vaccine diplomacy, Nepal was unable to acquire the required quantities of vaccines to immunize most of its citizens in a timely manner.

Advocacy for Mountain Ecology

Mountain ecology is a domain that could help Nepal assume a leading role in the formation of an inter-governmental advocacy group through science diplomacy. The topography of Nepal itself makes it a natural laboratory, with an altitude difference of 8800 meters between the highest altitude in the Himalayas and lowest altitude in the plains. This large altitude difference makes Nepal an ideal country for different flora and fauna. Due to the weak science diplomacy from Nepal's end, it has been unable to effectively represent this at international biodiversity forums to garner funds and world attention for high altitude ecological research. Although Nepal has a negligible role in emitting greenhouse gases and contributing to global warming, the weaknesses in climate diplomacy has hampered our ability to receive the climate funds to the extent that we deserve. The Government of Nepal (GoN) does realize that global warming will affect our high-altitude ecosystems. The rise in global temperature will lead to glacier melt and rise in water levels in our rivers, and invite other natural calamities such as floods and landslides. Although the GoN has not yet been able to take a lead in raising voice against

global warming and transboundary pollution, it has made some efforts to garner international attention for addressing climate change. For example, the cabinet meeting held in Kalapathar near the Everest base camp at an altitude of 5250 meters during the premiership of Mr. Madhav Kumar Nepal in 2009, and the government's plan to hold Sagarmatha Sambaad, a global dialogue forum on the theme "Climate Change, Mountains and the Future of Humanity" are some of Nepal's efforts in responding and advocating for climate change.

Key Players for Promoting Science Diplomacy in Nepal

Government think-tanks such as the Institute of Foreign Affairs (IFA) Nepal has played a crucial role in promoting science diplomacy mainly by training diplomats and organizing seminars on the issues revolving around science diplomacy. Universities are also important stakeholders in science diplomacy as they bring together experts on science and technology and foreign policy, which makes them the right platform for discourse on science diplomacy. Seminars conducted by the Research Center for Applied Science and Technology (RECAST), Tribhuvan University in collaboration with Asian Institute of Diplomacy and International Affairs, by inviting top scientists and policymakers in the field is a testimony to the role of academia in promoting science diplomacy. Similarly, the Department of International Relations and Diplomacy at Tribhuvan University also conducts activities to disseminate awareness on science diplomacy. Nepali universities also attract international funding from funding agencies, government institutions including embassies and conduct research projects in collaboration with foreign academicians. Such engagements also play a role to enhance science diplomacy.

Individuals need a valid visa for cross-border travel but knowledge does not. Nepali academicians residing and working abroad have always demonstrated a great degree of patriotism and made outstanding contributions for establishing scientific collaboration in Nepal. In particular, the NRNA has facilitated the technology transfer activities at an institutional level. While largely acting as the focal unit for technology transfer, the Skill, Knowledge and Technology Transfer division of the NRNA plays a vital role to connect diaspora intellects and provides platform for networking and knowledge sharing through events such as the NRN Global Knowledge Convention in collaboration with the GoN. Similarly, Nepali academicians working in Japan had organized the Nepal-Japan Dialogue Series in collaboration with the Nepal's embassy in Tokyo to discuss technology transfer in various sectors including agriculture, ICT and healthcare. The organizers had invited high-profile panelists such as the professors of Japanese universities and directors of companies. The output of each of the dialogue series events, and the avenues and recommendations for technology transfer was compiled and a 23 -page report was submitted to the then Minister for Education, Science and Technology Mr. Giriraj Mani Pokharel; the vice-chancellor of NAST, Dr. Sunil Babu Shrestha, and the Ambassador of Nepal to Japan Ms. Prativa Rana. These types of interactions in foreign lands with high-profile foreign academicians and industry professionals can be instrumental in fostering science diplomacy.

Rightly realizing the strength of Nepali academicians and technocrats working in foreign lands, the Ministry of Foreign Affairs (MoFA) has established a Brain Gain Center to facilitate the knowledge exchange and technology transfer through various online conferences. Similarly, the Brain Pooling Nepal program of NAST has been helping returnee scientists and technocrats to connect with science related careers and academic societies in Nepal. However, there is still a need for the government to effectively connect the broad spectrum of the Nepali diaspora intellect and make their inputs evident in policy. In this regard, perhaps, the MoFA should consider appointing at least one science and technology ambassador from among Nepali professionals in each country, similar to the practice of appointing honorary consuls or tourism ambassadors. These positions are largely honorary and appointing science and technology ambassadors incur minimal financial obligations, but the local networking that these professionals can do and their knowhow of local language and culture will assist GoN towards assimilating science as a vital component of diplomacy.

Way forward

Increase Governmental Spending on Science and Technology

Science diplomacy is relatively a new concept even in affluent countries. Aligning foreign policy with the demands of the global trends of science diplomacy and proactive leadership is required for integrating science diplomacy into regular foreign policy. When conceptualizing science diplomacy, policymakers should bear in mind that science speaks evidence and facts. Facts and data can be generated only by investing in capacity building of human resources and allocating adequate resources for research. Providing seed funding to start-up technology ventures, financial support to promising research projects, and investment in scientific research and education are crucial investments for capacity building. However, the government's investment in science and technology in Nepal remains abysmally low. For example, in contrast to investments elsewhere – 4.5 percent of GDP in science and technology in South Korea, 3.3 percent in Japan, 2.8 percent in USA, and 2.1 percent in China – Nepal spends only 0.3 percent of its GDP (The World Bank: data of 2018 for South Korea, Japan, USA and China, and 2010 for Nepal). Learning lessons from practices in developed countries, the government should also focus on schemes to attract private sector to invest in science and technology. Strategies such as relaxation in tax policies and easing of legal hurdles and hassles can contribute towards increasing private investment in scientific research.

Intergovernmental Collaborative Funding in Research and Development

Nepal should also lobby in international forums to attract intergovernmental collaboration and funding. Nepal could be an excellent location for the international community to research on high-altitude ecosystems, biodiversity, and climate change. Strong science diplomacy from GoN

to establish an international research center in Nepal with funding from multiple countries can not only contribute to economic upliftment but will also have broader implications on knowledge creation. Nepal can learn from Chile's experience. The Atacama Large Millimeter/submillimeter Array (ALMA), the largest astronomical project in the world with intergovernmental funding from the European Union, USA, Japan, Canada, South Korea and Taiwan, has benefited Chile's socioeconomic development (Mauduit, 2017). The unique and ideal atmospheric condition there is conducive for establishing a satellite observatory. It also has stable politics, friendly government policies such as diplomatic immunity for researchers, tax relaxations, political support, and proactive science diplomacy. These helped Chile to attract foreign investment and highly skilled human resources in astronomical sciences. As vast majority of observatory officials are Chileans and Chile is now seen as the Astro-tourism hub in the world, the ALMA project created job opportunities for the locals.

The quality of astronomical research in Chile has also enriched with the establishment of the ALMA observatory as it supports capacity building of Chilean university students, technicians, and researchers. Similarly, ALMA Region II fund from the ALMA project supports tourism and infrastructure development of the Antofagasta area, the region where the satellite observatory is located. The establishment of a similar intergovernmental research facility in Nepal can also assist its socio-economic development.

Focal Persons for Science Diplomacy

Nepal's government agencies do not have a full-time, focal personnel for science diplomacy. The MoFA should devise a mechanism to appoint a full-time science attaché who can engage in science diplomacy at some diplomatic missions abroad. Similar to the practice in France, such personnel could be an established, Nepali scientists from either the government research institutes such as NAST, Nepal Agriculture Research Council (NARC), or universities and private research institutes. To assist science attaché with the local scientific culture and language, it will also be necessary to appoint at least one Nepali scientist with a doctorate degree working in the scientific research sector in that country. Moreover, in regions of high strategic interest, MoFA should deploy some of the high-profile Nepalese scientists from government research institutes and universities to missions abroad for a short-term, typically for a couple of weeks. This concept of "Scientopolitics" is similar to that of the U.S. Science Envoy Program that has been in operation since 2010 during the presidency of Barack Obama (Zewail, 2010). Some of such envoys included Dr. Ahmed Zewail, recipient of the 1999 Nobel Prize in Chemistry; Dr. Elias Zerhouni, former director of the National Institutes of Health; Dr. Geraldine Richmond, former president of American Association for the Advancement of Science; Dr. Margaret Leinen, Director of Scripps Institution of Oceanography; Dr. Alice Gast, former President of Lehigh University and the current President of the Imperial College London; Dr. Rita Colwell, former director of the National Science Foundation; and Dr. Bruce Alberts, former president of the National Academy of Sciences. In the Nepali context, a science and technology advisor to the Prime Minister in the Federal Government and the Chief Ministers in provinces can also support

science diplomacy. Similarly, inclusion of scientists in high level delegation during visits of the President or Prime Minister to foreign countries can ease discussions in the area of science and technology.

Conclusion

Science diplomacy has become an integral component of diplomacy in developed countries. In this article, we have highlighted some of the initiatives that advanced nations have adopted to promote science diplomacy as a key component of soft diplomacy. However, in Nepal, there has hardly been any mention of science diplomacy in foreign policy. Further, there are only a few academic research and opinion articles regarding Nepali science diplomacy in national and international journals. Although some seminars and conferences on science diplomacy have been organized, their outputs have not been disseminated to the public. To promote science diplomacy, Nepal needs to prioritize science and technology and establish a dedicated center for promoting science diplomacy. Similarly, a strong voice on the need of adopting science diplomacy as a crucial component of diplomacy needs to come from the current and former Nepali diplomats. The media could also play an instrumental role to increase awareness among politicians and bureaucrats on matters relating to science diplomacy. Key players of science diplomacy such as the Ministry of Education, Science and Technology, NAST, universities, and the Institute of Foreign Affairs should also prioritize science diplomacy. Perhaps establishment of science and technology related organizations at major universities, such as Tribhuvan University or Kathmandu University could pave the way for science diplomacy (Shrestha, 2018). Different stakeholders should also regularly organize events related to science diplomacy and capacitate the government agencies to establish relations with foreign agencies and research centers. In this context, the initiative from NAST to establish Nepal Science Diplomacy Forum (NSDF) could be useful to promote such activities. The existing bureaucratic and legal procedures should be accordingly amended to incorporate innovative policies tailored to the needs of scientists and foreign policy experts, thereby making it easier to facilitate transfer of technology to Nepal from abroad. Priorities should be placed in facilitating technology transfer and promoting technology-driven, research-based industries in sectors such as clean energy, biodiversity, and mountain ecosystem. Above all, science diplomacy should be taught at the universities to build capacity of both the existing and aspiring diplomats. Nepal will be able to fully synchronize science in diplomacy only through capacity building of scientists and diplomats.

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For reference: Shrestha, S.B., Parajuli, L.k. and Shrestha M. V. (2022) "Science diplomacy:

An overview in the global and national context"

Journal of Foreign Affairs (JoFA), Volume 2, Issue 1

DOI: <https://doi.org/10.3126/jofa.v2i01.43892>