



NHSMUN

National High School Model United Nations

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A Note on the NHSMUN Difference

Esteemed Faculty and Delegates,

Welcome to NHSMUN 2027! We are Armen Bagdassarian and Sabeeh Mirza, and we are elated to serve as this year's Secretaries-General. Thank you for choosing to attend NHSMUN, the world's largest and most diverse high school Model United Nations conference. As a space for collaboration, consensus, and compromise, NHSMUN strives to transform today's brightest thinkers, speakers, and collaborators into tomorrow's leaders. We believe that an emphasis on education through simulation is paramount to the Model UN experience.

Realism and Accuracy: Although a perfect simulation of the UN is never possible, we believe that one of the core educational responsibilities of MUN conferences is to educate students about how the UN System works. We strive to invite real UN, NGO, and field experts into each committee through our committee speakers program. Moreover, we arrange meetings between students and the actual UN Permanent Mission of the country they are representing. These exclusive resources are only available due to IMUNA's formal association with the United Nations Department of Global Communications and consultative status with the Economic and Social Council. No other conference goes so far to deeply immerse students into the UN System.

Educational Emphasis: At the heart of NHSMUN lies education and compromise. Part of what makes NHSMUN special is its diverse delegate base. As such, when NHSMUN distributes awards, we strongly de-emphasize their importance in comparison to the educational value of Model UN. In particular, our daises look for and promote constructive leadership and diplomacy that strive toward consensus, as real ambassadors do in the United Nations.

Research and a Dedicated Staff: Our staffers care deeply about delegates' experiences and what they take away from their time at NHSMUN. Our Directors spend over six months preparing Background Guides, in addition to Update Briefs written to reflect the rapidly changing nature of the topics to be discussed. Our staffers are trained rigorously to provide the best conference experience possible. Our daises provide thoughtful comments on submitted position papers. Our staff aims to tailor the committee experience to delegates' reflections and research, but also to facilitate an environment where all delegates' thoughts can be heard.

Empowering Participation: The UN relies on the voices of all of its member states to create resolutions. This is our philosophy at NHSMUN too. Our Rules of Procedure and our staff focus on making every voice in the committee heard, regardless of country assignment or skill level. Additionally, unlike many other conferences, we also emphasize delegate participation after the conference. Delegates spend countless hours researching topics critical to the UN and broader international sphere.

Delegates, it is our sincerest hope that your time at NHSMUN will be thought-provoking and stimulating. NHSMUN is an incredible time to learn, grow, and embrace new opportunities. We look forward to seeing you work both as students and global citizens at the conference.

Best,

Armen Bagdassarian
Secretary-General

Sabeeh Mirza
Secretary-General

Position Paper Requirements

Delegate research and preparation is a critical element of attending NHSMUN and enjoying the debate experience. We have provided this Background Guide to introduce the topics that will be discussed in your committee. We encourage and expect each of you to critically explore the selected topics and be able to identify and analyze their intricacies upon arrival to the conference.

The task of preparing for the conference can be challenging. To assist delegates, we have updated our [Beginner Delegate Guide](#) and [Advanced Delegate Guide](#). These guides contain more detailed instructions on how to prepare a position paper and excellent sources that delegates can use for research. Use these resources to your advantage. They can help transform a sometimes overwhelming task into what it should be: an engaging, interesting, and rewarding experience.

To accurately represent a country, delegates must be able to articulate its policies. Accordingly, NHSMUN requires each delegation (the one or two delegates representing a country in a committee) to write a position paper for each topic on the committee's agenda. More information about how to write and format position papers can be found in the [Research Guide](#). To summarize, position papers should be structured into three sections.

I: Topic Background – This section should describe the history of the topic as it would be described by the delegate's country. Delegates do not need to give an exhaustive account of the topic, but rather focus on the details that are most important to the delegation's policy and proposed solutions.

II: Country Policy – This section should discuss the delegation's policy regarding the topic. Each paper should state the policy in plain terms and include the relevant statements, statistics, and research that support the effectiveness of the policy. Comparisons with other global issues are also appropriate here.

III. Proposed Solutions – This section should detail the delegation's proposed solutions to address the topic. Descriptions of each solution should be thorough. Each idea should clearly connect to the specific problem it aims to solve and identify potential obstacles to implementation and how they can be avoided. The solution should be a natural extension of the country's policy.

Each topic's position paper should be **no more than 10 pages long** double-spaced with standard margins and 12 point font size. This is a maximum; **3–5 pages per topic is often a suitable length**. The paper must be written from the perspective of your assigned country and should articulate the policies you will espouse at the conference.

Each delegation is responsible for submitting position papers on or before **February 26, 2027**. If a delegate wishes to receive detailed feedback from the committee's dais, their position paper must be submitted on or before **February 5, 2027**. The papers received by this earlier deadline will be reviewed by the committee dais and returned before February 26. Instructions on how to submit position papers will be shared directly with faculty advisors.

Submission instructions for position papers will be sent to faculty advisers via email. If delegations are unable to submit their position papers on time, please contact us at nhsmun@imuna.org.

Delegations that do not submit position papers will be ineligible for awards.

Committee History

The United Nations Commission on Science and Technology for Development (CSTD) was created in 1979 at the UN Conference on Science and Technology for Development in Vienna, Austria.¹ In 1992, the General Assembly (GA) transformed it into a commission that aims to foster an understanding of science and technology policies, specifically in developing countries, and formulate recommendations and guidelines on these matters.²

CSTD works as a subsidiary body of the Economic and Social Council (ECOSOC) and is hosted annually in Geneva, Switzerland by the United Nations Conference on Trade and Development. The committee has 43 member states, elected by the Economic and Social Council for four years.³ This committee's purpose is to provide a seminar where countries can discuss challenges created by the growth of technological developments.⁴ The commission advises any willing UN member to ensure they are not left behind. Also, it aims to create a safe environment where the appropriate decisions and advice relating to these topics can be made. The CSTD focuses on broad issues, including biotechnology, nanotechnology, energy, space, environmental, and health technologies. The mandate or mission has evolved over the years to reflect the changes in the global landscape and the increasing importance of science and technology for development. Today, CSTD examines how science, technology, and innovation can support sustainable development, especially in developing countries. Its work includes digital inequality and emerging technologies, as well as the skills and infrastructure needed to benefit from them.⁵

Moreover, this committee is consultative, providing advice and recommendations to ECOSOC and the GA. Its rules of procedure allow for flexibility in addressing emerging issues and adapting to changing circumstances. This committee is different from other commissions primarily due to its specific focus on science and technology issues in the context of development. The CSTD gathers experts in various science and technology fields to create informed suggestions to both ECOSOC and the GA, which is the primary form of action it can take.⁶ It also strives for balanced representation to ensure that diverse perspectives are considered. The committee has 43 member states, elected by the Economic and Social Council for four years.⁷

CSTD brings governments together to examine technology challenges and recommend responses to ECOSOC. Its reports identify barriers facing developing countries, such as limited infrastructure and technical skills, and consider how international cooperation could help address them. CSTD cannot require countries or companies to follow its recommendations. However, it can identify barriers that prevent countries from benefiting from science and technology and recommend ways for governments and international partners to address them.⁸

¹ "About the CSTD," UN Trade and Development, accessed September 20, 2024, unctad.org/topic/commission-on-science-and-technology-for-development/about.

² UN Trade and Development, "About the CSTD."

³ "Commission on Science and Technology for Development" UN Trade & Development, accessed September 21, 2024, unctad.org/topic/commission-on-science-and-technology-for-development

⁴ Lynch, Cecelia, Fomerand Jacques, Levy, Michael. "Economic and Social Council" accessed September 22, 2024, www.britannica.com/topic/Economic-and-Social-Council

⁵ UN Economic and Social Council, "MANDATE," Accessed September 22, 2024, www.un.org/en/ecosoc/newfunct/amrmandate.shtml.

⁶ "Mandate and Institutional Background" UN Trade & Development, accessed September 23, 2024, unctad.org/topic/commission-on-science-and-technology-for-development/mandate

⁷ "Membership of the CSTD" UN Trade & Development, accessed September 24, 2024, unctad.org/topic/commission-on-science-and-technology-for-development/membership

⁸ "UN Commission on Science & Technology for Development (CSTD) - Global Cities Hub." 2022. Global Cities Hub. May 2, 2022. globalcitieshub.org/en/un-commission-on-science-technology-for-development-cstd/.

TOPIC A

CSTD | NHSMUN 2027

The Growing Artificial Intelligence Divide



Introduction

Artificial intelligence (AI) is reshaping the world as we know it, quickly becoming one of the most influential technological advancements. It is being integrated into core institutions in several fields including healthcare, agriculture, education, and finance. Yet this transformation is not happening equitably. The countries and communities best positioned to reap the benefits of AI tend to be the ones that were already wealthy, well-connected, and technologically advanced. For the vast majority of the world outside of that, the question is not whether AI will change their societies, but whether they will have any meaningful choice in how it does.¹

This growing gap between countries that are producing and controlling AI technology and those that are primarily consuming it, or being excluded from it altogether, has been called the “AI divide”. This divide is multi-dimensional, spanning hardware, infrastructure, human capital, and soft power. Training advanced AI models requires powerful computer chips, whose production and supply are concentrated in a small number of countries. The data centers that house these chips also require substantial electricity and investment, putting them beyond the reach of many countries.² Further, AI development and maintenance requires professional engineers and researchers that are currently concentrated in a handful of countries, drawn there by salaries that smaller economies cannot match.³

The question of who builds AI is intrinsically linked to the question of who governs it. Today, many of the laws surrounding AI development and usage are based on the European Union, the United States, and China, places that have the resources and expertise to lead AI development and adoption. Countries outside this group have had little formal input into these regulatory frameworks, yet they will be subject to their effects.⁴ The AI tools used within Zimbabwean schools, hospitals in Vietnam, and courts in Brazil will have been trained, tested, and governed by rules written by different countries with different interests.

The Commission on Science and Technology for Development (CSTD) is one of the few UN bodies with an explicit mandate to examine how technology affects development and to advocate for the interests of all states involved.⁵ During this conference, delegates in this committee will need to grapple with a difficult question: how can the international community ensure that the 21st century’s most transformative piece of technology serves humanity rather than deepening existing inequalities?

History and Description of the Issue

A BRIEF HISTORY OF AI DEVELOPMENT

Today, AI is synonymous with large language models (LLMs) and generative AI such as ChatGPT and Claude. These are massive computer programs trained on huge amounts of text data in order to generate output that resembles human language. However, many don’t know that the concept of AI has existed since the 1950s, with the term first being coined by John McCarthy in 1956.

Early pioneers of AI were driven by the belief that “Every aspect of learning or any other feature of intelligence can in principle be so precisely described that a machine can be

made to simulate it.”⁶ In the following decades, AI was mostly relegated to being a research project, from the first chatbot ELIZA to Shakey the Robot.⁷ AI was far from being commonplace at this point, but many of these projects laid the groundwork that later mainstream iterations would use.

In the late 1980s, after a period of relative silence called the AI winter, AI research became more popular again. Large projects such as the first self-driving car in 1986 and IBM’s Deep Blue, which defeated world chess champion Garry Kasparov in a 1997 match, helped renew interest and funding. This then led to significant developments in the 2000s. Prior to LLMs, the “Deep Learning revolution” created computer vision AI that could identify objects and faces, and powered speech to text systems such as Amazon’s Alexa and Apple’s Siri.

A massive breakthrough came in 2017, when researchers introduced the “**transformer**.” This is a new way of building AI models that lets the model process entire sentences at once instead of word by word using new “attention mechanisms.”⁸ These transformers made it possible to train much larger models on much larger datasets, which then led up to

the introduction of general-purpose chatbots in 2022. Adoption of such chatbots and LLMs accelerated in 2024, at which point LLM services began being integrated into healthcare, customer service, coding, and education.

While US companies such as OpenAI, Google, Anthropic, and Meta have led in releasing widely used general-purpose models, Chinese companies such as DeepSeek and local alternatives have shown that highly capable models can be built more cheaply and released as “**open-weight**” software, meaning that anyone can download and modify them.⁹ DeepSeek’s rise in particular was important as it suggested that smaller budgets and fewer top-end computer chips do not have to be a permanent barrier to advanced AI development.

For delegates, this history highlights the fact that AI is no longer an emerging technology but rather a foundational one, something that is rapidly reshaping economies and public services.

UNDERSTANDING AI RESEARCH AND DATA CENTERS

To fully understand the nuances of AI



IBM Deep Blue

Credit: James the photographer

development, it helps to develop a basic understanding of how such systems are built at a technical level. LLMs learn and pick up patterns in language using the previously mentioned transformer architecture, which uses “attention,” a system that lets the model consider how every word in a sentence relates to every other word.¹⁰ Effectively, this technique lets the model understand the context and meaning of the text rather than just reading it in order. To get this transformer to work however, it must be trained. Training a model means feeding it an enormous amount of text data, often scraped from the internet and other sources, so that the model can learn patterns in language well enough to predict and generate new text.

The input text given to an LLM is broken down into small units called **tokens**. These tokens can be whole words, parts of words, or even punctuation marks. The model then uses the training dataset to predict the next token given the context of all the tokens before it. Effectively, it is repeatedly being given a passage of text, and then being asked to predict the word that should come afterwards. This process is repeated a large number of times, at which point it undergoes further refinement through human feedback. Since these AI models learn from existing datasets, the languages and knowledge represented in those datasets can influence how accurately AI systems perform for various populations.

As previously mentioned, training a model and using it afterward both involve processing a large number of tokens. This processing is done using specialized computer chips, mainly graphics

processing units (GPUs), which are concentrated inside large facilities called data centers.¹¹ It’s worth making a distinction between traditional data centers and their new AI counterparts. Traditional data centers were built with storage in mind, containing a large number of hard drives that store data on the “cloud.” On the other hand, AI data centers are built to train AI models, running thousands of chips at once for weeks or months without interruption. These AI data centers are incredibly power hungry, with the needs of a single facility climbing into the hundreds of megawatts, comparable to the electricity use of a small city.¹²

These facilities also use enormous amounts of water, primarily for cooling.¹³ Because of these power and water demands, data centers are increasingly built in remote areas near cheap electricity and away from major population centers, which adds a further layer of negotiation between AI companies and local communities and governments. Countries with strong governance and abundant water-energy resources are better positioned to host this infrastructure sustainably and capture economic benefits without crippling local ecosystems. On the other hand, water-scarce or grid-fragile countries are forced to either accept extractive deals that deplete local resources, or forgo AI infrastructure entirely, leading to a further widening divide.

For governments, these technical realities mean that AI leadership is not determined by software alone, but also by access to energy, infrastructure, and advanced computing resources. Delegates must therefore consider

Training major LLMs often evaporates hundreds of thousands of liters of fresh water, and the rise of AI has pushed data centers’ share of national electricity use higher.

whether international cooperation should help countries overcome these structural barriers or leave AI development primarily to market forces.

STRUGGLES WITH AI DEVELOPMENT AND INTEGRATION

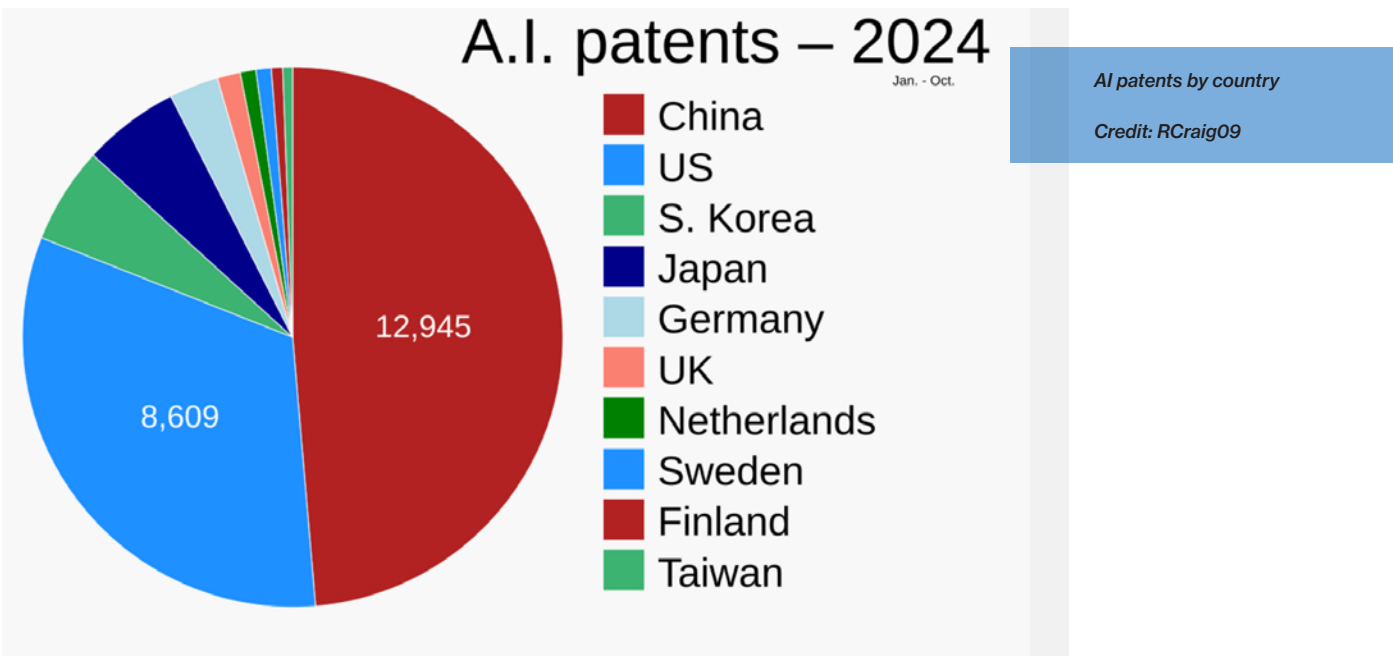
There are several practical barriers that countries and organizations may face when trying to expand their AI development. The most relevant limitation is access to computing power: the capacity provided by specialized chips, often housed in data centers, to train and run AI models. A 2025 World Bank report found that almost all of the world’s supercomputing capacity is concentrated within the US, Western Europe, and China.¹⁴ In fact, only 32 countries host major AI data centers at all.¹⁵ Countries do not necessarily need to build their own frontier models or data centers to benefit from AI. Some may instead secure affordable cloud access or adapt smaller models to local languages and needs, though these approaches raise questions about cost and dependence on foreign providers.¹⁶

The second barrier is technical expertise. AI systems require specialized engineers and

researchers. Many universities and companies in lower-income countries struggle to raise or retain such talent, especially due to high compensation in developed AI hubs leading to significant brain drain.¹⁷ An inability to retain such expertise means that lower-income countries are less likely to innovate and iterate further on existing AI infrastructure, but also less likely to have the workforce necessary to support integration and awareness of such systems.

There are also hindrances to the adoption of such AI technology. Without reliable electricity and internet access, people may be unable to use AI tools even when those tools are available. In 2025, an estimated 2.2 billion people remained offline, most of them in low- and middle-income countries.¹⁸ Separately, a lack of data in local languages can make AI systems less useful for those communities.

These issues are compounded by the fact that practical skills needed to use tools safely and efficiently, called technological literacy, can be missing even within regions where access exists. This gap is particularly important in the context of AI, with the presence of well-documented limitations such as **hallucinations**, referring to when an AI model produces information



that sounds confident and convincing but is factually wrong or entirely made up.¹⁹ These hallucinations happen since AI text generation is based on patterns rather than verified facts, which risks affecting every user, but is especially dangerous when AI literacy is low, leading to people believing misinformation that ends up being repeated in classrooms, courts, and health clinics.²⁰

While these barriers present significant challenges, overcoming them is important due to AI's immense potential in regards to accelerating economic and social development across several key sectors. For example, health programs use AI software to screen chest X-rays for signs of tuberculosis, while researchers use AI to identify potential new antibiotics.²¹ In Kerala, India, an agricultural platform uses satellite data and AI to monitor crops and is developing advice for farmers on irrigation, fertilizer use, and pests.²² These applications can increase productivity, reduce costs, and improve quality of life when implemented responsibly.

These barriers highlight that the AI divide is, ultimately, more of a challenge in terms of development than technology. Delegates should therefore consider which policies, from infrastructure investment and education to financing and technology-sharing, are most effective at helping all countries fairly participate in the AI economy.

GLOBAL AND REGIONAL AI TRENDS

The use of LLMs in the world has grown quickly. By the second half of 2025, an estimated 16.3 percent of the world's population had used a generative AI tool.²³ However, the adoption of such technology has been uneven. On average, adoption rates in the Global North are estimated at around 24.7 percent of the population, compared to about 14.1 percent in the Global South, with a few standout exceptions such as the United Arab Emirates and Singapore, who have invested heavily and early in national AI strategies.²⁴

Asia is currently home to several of the world's fastest-growing AI markets such as South Korea, helped by major improvements in non-English language performance. Furthermore, countries such as Malaysia are investing heavily in AI to join existing premier data center hubs such as Singapore, although they are facing large amounts of public scrutiny due to their heavy water and energy demands.²⁵

Latin America has also seen a surge in everyday AI use, although there is still a large deficit in public trust and investment.²⁶ Latin America currently holds around 9 percent of the world's population and generates around 6.6 percent of global GDP, but receives barely more than 1 percent of global AI investment, a phenomenon that is projected to worsen as the AI talent gap widens.²⁷

Africa's AI adoption has shown a distinct pattern, driven heavily by the open-source Chinese model DeepSeek. Its free, low-cost service has been adopted at two to four times the rate seen in other regions, aided by partnerships between Chinese firms and African telecommunications providers.²⁸ This is a good example that illustrates how affordability and effective distribution, over pure model quality, can determine which AI tools are selected.

Finally, it is worth noting that even within the same country, adoption is uneven across sectors and income levels. While AI can improve productivity and support highly skilled workers, it also has the potential to automate routine cognitive tasks, disproportionately affecting and displacing lower-income workers and labor-intensive service industries, such as call centers. In the United States, for example, AI usage in tech-based sectors is significantly greater than their manufacturing or agricultural counterparts, emphasizing that AI's gains so far have mostly benefited workers in white-collar roles.²⁹ As a result, policymakers must also consider how to support workforce reskilling in order to ensure that the benefits of AI-driven growth are shared more equitably.

All of this suggests that narrowing the AI divide requires looking beyond just inter-country differences, also considering which sectors, communities, and income groups are being left behind.

Current Status

THE UN AI RESOURCE HUB AND UNESCO CAPACITY-BUILDING EFFORTS

The United Nations has begun coordinating its response to the AI divide through dedicated platforms and education programs. A significant recent development is the UN AI Resource Hub, launched on December 15, 2025. Developed by the United Nations Development Programme (UNDP), the International Telecommunication Union (ITU), and UNESCO, this initiative brings together over 750 AI initiatives from more than 50 UN entities, covering development projects, humanitarian operations, and responsible AI policies.³⁰ It serves as a centralized database for governments, researchers, and civil society organizations, allowing them to find relevant UN AI programs by sector, region, or theme, thus making it easier to identify existing efforts and avoid wasting resources on duplication.

Alongside the hub, the ITU has also established an AI Skills Coalition with over 30 public and private sector partners, aiming to train over 10,000 individuals through a dedicated skills platform, aiming to help people use AI tools effectively and critically.³¹ The World Economic Forum estimates that 77 percent of employers plan to reskill or upskill their workforces to use AI by 2030, a target that presents a serious challenge for governments in regions with constrained education budgets.³²

UNESCO's programs have expanded significantly as well. In 2025, the Global Skills Academy program was launched in partnership with Microsoft, aiming to train over 500,000 teachers and students across six countries by the end of

2026.³³ For example, in Kenya, the program has enrolled more than 200 teachers in structured AI learning pathways, reaching over 5,300 beneficiaries and 21 technical and vocational education institutions. The program is now being expanded to Ghana, India, Malaysia, Uganda, and Tanzania. UNESCO has also been supporting African countries such as Benin and Senegal in developing national AI competency frameworks for teachers and students.³⁴

In practice, these programs are primarily delivered online. Teachers complete structured learning pathways through Microsoft Learn, an online platform, before earning a Microsoft-issued AI certification. The model is designed to “cascade” or snowball, with trained teachers then guiding their own students through personalized courses. National governments play a coordinating role, with Kenya's Ministry of Education helping to expand institutional access and integrate AI literacy into the official curriculum. Funding comes through a combination of UN agency budgets, government contributions, and corporate partnerships, most prominently Microsoft, which provides the main course platform. This system, which combines both public and private actors, reflects the scale of resources needed for AI education, and the degree to which private technology companies have become central actors.

There are important limitations to these initiatives, however. As of late 2025, UNESCO's Readiness Assessment Methodology program, used to identify gaps in the AI policies of different governments, had been initiated in only 75 countries.³⁵ That leaves the majority of UN member states without a systematic national AI policy review. More pressingly, participation in UN AI programs often depends on countries already having met prerequisites such as English proficiency and reliable internet connectivity, conditions that many lower-income countries do not yet have. The model also assumes that cascading knowledge will work, an unfounded assumption as consistently passing down skills to students without proper follow-up and support

can lead to a sharp decline in the quality of instruction.

A deeper structural issue with such a program concerns language. A vast majority of frontier AI models have been trained largely on English-language data, with research finding that countries whose languages are underrepresented in AI training datasets have adoption rates roughly 21 percent lower than comparable countries, even after accounting for other factors such as income, electricity, and internet.³⁶ Given that all of these programs are still primarily designed around English-language trained tools and platforms, despite efforts to include French and other languages, critics worry that such initiatives are not sufficiently built around the specific needs and existing infrastructure of the people receiving them.³⁷ The question that delegates should ponder is whether these existing programs are designed in a way that genuinely narrows the divide rather than simply extending the reach of existing AI ecosystems into new markets.

For delegates, an important consideration is whether existing UN initiatives are ambitious enough to meaningfully reduce the AI divide or whether new funding mechanisms and

partnerships are needed.

DEEPSEEK: A CASE STUDY IN OPEN-WEIGHT AI AND ITS GEOPOLITICAL IMPLICATIONS

In January 2025, a Chinese company named DeepSeek released a model called R1, which shook up the AI landscape. Its performance was comparable to leading American models but operated at a fraction of the cost while using significantly less computing power.³⁸ The announcement caused a massive stir in global markets. Nvidia, the dominant manufacturer of GPU chips, lost over USD 590 billion in market value in a single day.³⁹

DeepSeek's introduction was especially significant given the context in which it was developed. The US government had imposed several strict export controls on semiconductor chips, explicitly intended to slow China's ability to develop frontier AI.⁴⁰ DeepSeek demonstrated, by introducing algorithmic improvements that compensated for the reduced processing power, that such policies were insufficient to prevent China from developing frontier models. DeepSeek managed to train a competitive model

DeepSeek logo

Credit: Usertoop



using a lower quality and quantity of chips that were legally available to Chinese buyers. Experts note that such constraints appear to have driven innovation rather than simply blocking progress.⁴¹

DeepSeek chose to release its “open-weight” system under the MIT License. This means that anyone can freely download, use, and modify the system without needing to pay or ask for permission. The introduction of a free model that didn’t need a paid subscription rapidly became popular in regions where cost had been a barrier to AI adoption. African states in particular adopted DeepSeek quickly, with usage there, accelerated by partnerships between Chinese technology firms and local telecommunications providers, being extremely high.⁴²

However, it’s important to make a distinction between DeepSeek being open-weight compared to being open-source. DeepSeek did not release its training data, how it fine tuned the models, or release complete architecture documentation.⁴³ Effectively, this means that although the final product is available for public use, how this product came to be isn’t. Security researchers also worry that the website hosted version of DeepSeek might share sensitive data with the Chinese government. Several governments, including those of Australia and Italy, have moved to restrict or investigate DeepSeek’s use on government devices.⁴⁴

For delegates, DeepSeek raises a complex set of questions about the way that access and geopolitics engage with one another. Open-weight AI models, regardless of their country of origin, meaningfully lower the barriers to entry for developers in lower-income countries who are otherwise paywalled from US models. Yet, the dominance of an AI ecosystem from a single country, regardless of which one, carries risks surrounding data sovereignty, censorship, and dependence. If governments, businesses, schools, and public institutions become heavily reliant on AI systems developed abroad, they may also become dependent on the country that controls those systems for

future software updates, security patches, cloud infrastructure, and technical support. Over time, this dependence could reduce a country’s ability to develop domestic AI industries, limit its technological sovereignty, and leave it vulnerable if geopolitical tensions, sanctions, or changes in foreign policy disrupt access to AI tools on which essential sectors increasingly rely.

Ultimately, DeepSeek has shown that government subsidies and a willingness to invest in algorithmic research can meaningfully alter who is able to compete in AI beyond just who has access to the most powerful chips. At the same time, it demonstrates that expanding access to AI can also reshape geopolitical influence. For developing countries, the question is therefore not simply how to obtain affordable AI, but how to do so without becoming overly dependent on any single foreign AI ecosystem. Delegates must weigh the immediate developmental benefits of low-cost AI against the long-term risks of dependence, security concerns, and reduced domestic innovation.

THE FRAGMENTED LANDSCAPE OF AI GOVERNANCE

Global AI capabilities and usage are rapidly expanding, but the international governance of AI remains deeply fragmented. There are no binding global treaties on AI. Instead, different regions and countries have pursued their own regulatory approaches, reflecting their own economic interests and political philosophies. The patchwork of legislation that such countries come up with, often without any input from smaller and developing states, affect the entire world.⁴⁵

AI systems have already been used to generate convincing deepfakes, spread large amounts of misinformation during elections, automate cyberattacks and online fraud, and produce inaccurate outputs in areas such as hiring, healthcare, and criminal justice. Poor AI governance does not create appropriate safeguards, which allows these risks to

undermine public trust, threaten democratic institutions, and cause disastrous economic and social harm. Governments therefore face the challenge of balancing innovation with ensuring that AI is developed and deployed in ways that are safe, accountable, and help the average person.

The most comprehensive AI regulatory framework currently is the European Union's Artificial Intelligence Act (EU AI Act), introduced on August 1, 2024, with its most consequential phase between 2026 and 2027. The act categorizes different AI systems into different risk tiers. Based on these tiers, certain applications are banned outright, strict requirements are imposed on high-risk systems, and responsible innovation is encouraged in lower-risk ones. Violating the act's provisions can result in fines of up to EUR 35 million, or roughly 7 percent of a company's global revenue.⁴⁶ The act's influence extends beyond EU borders, stating that any company whose AI systems produce outputs used within the EU is subject to its requirements, regardless of where that company is based.⁴⁷ This extraterritorial effect, called the "Brussels Effect," means that international companies are influenced by European rules regardless of what their home governments want.

The United States' strategy is quite different. Rather than pursuing comprehensive legislation, the US has chosen to prioritize innovation and national competitiveness, exemplified by President Trump's executive order in December 2025 which explicitly directed the national AI framework to be as minimally burdensome as possible.⁴⁸ The United States

and the United Kingdom also did not sign the AI governance declaration at the Paris AI Action Summit in early 2025, which called for open, inclusive, transparent, safe, and trustworthy AI development.⁴⁹ China has also veered in its own unique direction, developing its own national AI governance architecture, including a 2024 AI Safety Governance Framework, but not prioritizing political pluralism or press freedom as AI values.⁵⁰

As of early 2026, the Organisation for Economic Co-operation and Development (OECD) AI Policy Observatory tracked over 1,000 AI policy initiatives across 69 countries.⁵¹ This proliferation of national frameworks, while reflecting genuine governance activity, also creates a compliance burden that disproportionately affects countries without large policy bureaucracies, and it reinforces the concentration of rule-making authority in wealthy, technologically advanced states. For a country in sub-Saharan Africa or Central Asia, the practical choice may be to adopt European-style rules, align with Chinese frameworks, or follow United States guidelines, largely depending on which AI companies operate in their market, not on any sovereign policy preference.

The Global Digital Compact (GDC) was adopted during the 2024 UN Summit of the Future, representing efforts to create more inclusive AI governance through initiatives such as trying to establish a formal input channel for developing countries.⁵² In 2025, the General Assembly also established an Independent International Scientific Panel on AI and a Global Dialogue on AI Governance.⁵³ The Panel provides scientific

The need for AI governance stems from the technology's growing impact on society and the risks associated with its misuse.

assessments, while the Dialogue gives countries a forum to discuss AI policy. These initiatives do not create binding global rules for AI. Countries investing most heavily in AI development still have substantial influence over how it is governed, a dynamic that the CSTD is well positioned to examine but cannot resolve by itself.

Bloc Analysis

POINTS OF DIVISION

Delegates in the CSTD will bring sharply different perspectives to the AI divide not simply based on geographic differences, but due to differences in capacity, governance philosophy, and strategic interest.

The first layer to consider concerns capability. Some states are already producing frontier AI and have strong incentives to protect the competitive advantages that come from that position. Others are rapidly trying to climb into AI development, seeking partnerships and investment. Meanwhile, many states are primarily AI consumers who are largely excluded from meaningful development.

When determining where your country fits, consider its role in the global AI ecosystem. Does your country develop advanced AI models, or does it primarily rely on foreign AI systems? Has it published a national AI strategy outlining goals for AI development and adoption? Does it host major AI data centers or invest heavily in computing infrastructure? Is it actively trying to become a regional AI hub? These questions will guide your understanding of your country's priorities and negotiating position.

The second layer to discuss is the governance of AI. States disagree significantly on how AI should be regulated, differing on key questions such as whether safety rules should be binding or voluntary, who should write those rules, and whether the free exchange of AI technology and

open-source models is good for the public. All of these questions are complicated further by the competition between the United States and China, influencing governance norms spread in developing markets.

Delegates should examine what AI governance initiatives their country has supported and what regulatory philosophy it tends towards. Does your country prioritize innovation or stronger regulation? Does it prefer national regulation or multilateral governance through organizations such as the United Nations? Does it align more closely with the approaches taken by the European Union, the United States, China, or the UN? Has it ever signed or publicly supported major international AI initiatives? These questions will help identify your country's preference in terms of AI governance.

The final major layer concerns technology transfer. Wealthier states that are currently producing AI tend to guard their technology closely, using intellectual property protections and export controls. Developing countries, the largest and most diverse bloc in the CSTD, prioritize gaining access to these AI tools, training, and infrastructure. The tension between these two positions sits at the core of most substantive negotiations in this committee.⁵⁴

Delegates should investigate what their country has advocated for in international discussions on AI and technology. Is your country seeking greater access to AI models, computing infrastructure, technical expertise, or training? Does it prioritize protecting intellectual property and export controls, or is it vocal in its support of technology sharing? Does it advocate for capacity-building programs? What is its position on open-source or open-weight AI models? Understanding these priorities will help you identify where your country is likely to stand during negotiations.

BLOC 1: INNOVATION-FIRST STATES

This bloc consists of states that have already established significant AI industries, research institutions, and regulatory frameworks of their own, such as the United States. Their primary interest is in maintaining the conditions that allow AI innovation to continue growing within their borders, such as relatively open investment environments, strong intellectual property protections, and regulatory approaches that deprioritize compliance burdens on their domestic companies.

Countries in this bloc would be opposed to technology transfer mandates, viewing them as threats to the competitive advantages that they believe their companies have earned through private investment. These countries also tend to favor frameworks such as G7 Hiroshima AI Process and the OECD AI Principles, built by actors sharing similar economic systems and levels of AI development, over UN-based frameworks that give an equal voice to all member states regardless of technological capacity.⁵⁵

Proponents of this approach argue that smaller, like-minded coalitions are more capable of reaching binding and enforceable commitments than large multilateral bodies, where consensus is harder to achieve and enforcement mechanisms are weaker. Detractors counter that governance written by a handful of powerful states and their largest technology companies will inevitably reflect those actors' interests, particularly around intellectual property, data access, and market access, rather than the interests of the majority of the world's population. For delegates representing countries outside these groupings, this tension between the efficiency of club governance and the legitimacy of universal participation is one of the defining fault lines of the debate.

Within this bloc, however, there are meaningful internal divisions. The European Union members of this group, including France, Germany,

and the smaller EU states, have embraced comprehensive binding regulation through the EU AI Act, reflecting a values-driven approach that prioritizes rights, transparency, and accountability. By contrast, the United States and the United Kingdom have explicitly rejected this model in favor of lighter-touch, pro-innovation frameworks.⁵⁶ These differences may create openings for compromise in committee, since members of this bloc do not all share the same vision for how AI governance should be structured.

While this bloc is unlikely to support strong technology transfer requirements, many of its members may be open to capacity-building programs, public-private partnerships, or education initiatives that do not threaten proprietary interests, particularly when viewed from the lens of market expansion and economic benefits of AI adoption in new regions.

BLOC 2: DIGITAL SOVEREIGNTY ADVOCATES

This bloc consists of nations that share a common skepticism of Western-led AI governance frameworks, with a preference for multilateral approaches to AI development and regulation that do not give authority to norms dominated by the United States or the European Union. These countries tend to view AI governance proposals from Western institutions as tools of geopolitical influence, thus preferring arrangements that allow each country to develop and regulate AI within their own political and cultural context.⁵⁷

China occupies a unique central role within this bloc, simultaneously being a frontier AI power while also positioning itself as an advocate for developing countries in multilateral forums, often arguing that Western regulatory frameworks are being designed to entrench existing technological structures. China's open-weight AI models such as DeepSeek represent a practical expression of this position. By releasing AI that

is competitive with major models at little to no cost, Chinese companies reduce dependence on expensive US proprietary models. However, critics point out that these Chinese AI tools trade off one form of dependency for the other, as users now need to consider censorship, data governance concerns, and strategic alignment with Chinese foreign policy interests.⁵⁸

Smaller members of this bloc, such as Cuba, are not primarily driven by AI leadership, and are rather interested in resisting an environment in which they have no meaningful voice. These countries are likely to support multilateral mechanisms, including through the UN and CSTD, that give all states a formal say in how AI development and regulation unfolds globally.

BLOC 3: STATES DEMANDING ACCESS AND EQUITY

This is the largest and most geographically diverse bloc in the committee, likely comprising the majority of CSTD member states from Africa, Latin America, and parts of Asia and the Pacific. These countries are not producing or regulating frontier AI. What they share is the recognition that AI will radically affect their economies and societies, from labor markets and agricultural tools to healthcare delivery and educational access, and an understanding that they currently have very little influence over how it develops or how it is governed.

The primary demand from this bloc is access to AI tools, training data better reflecting specific languages and contexts, computing infrastructure, and education and capacity-building programs. Many delegates in this group will argue that the current structure of the AI economy, with chips, datasets, and expertise largely controlled by a small number of corporations in a small number of countries, constitutes a structural inequality that the international community has a responsibility to address.⁵⁹

It is worth re-emphasizing that countries in

this bloc vary significantly in their economic development status and what tactics they prefer in order to get access and equity in the field of AI. Some will prioritize technology transfer mandates and binding requirements, whereas others may favor voluntary frameworks. The uniting link for all these countries is a shared concern that AI, if left unchanged from its current trajectory, will amplify the same disparities that they experienced during the proliferation of the internet and mobile communication, where developing countries arrived late, on terms set by other nations, and then only managed to capture a limited share of the total value.⁶⁰

BLOC 4: STATES SEEKING A SEAT AT THE MAJOR AI TABLE

This final bloc occupies a distinct position in the middle of the broader debate. These are countries that have meaningful, and in some cases significant, AI development capacity of their own. India has a large pool of software engineers and is investing heavily in AI infrastructure and locally trained models. Similarly, Brazil has begun developing AI tools in Portuguese, and Saudi Arabia and the UAE have made AI an essential element of their national economic strategies.⁶¹ While these countries are not frontier AI powers in the same sense as the United States or China, they are not simply consumers either.

A distinguishing characteristic of this bloc is its desire for agency in the international AI system. These states want their own companies, datasets, and preferences to be reflected in current systems and norms. They are likely to push for meaningful inclusion in AI standard-setting processes and to oppose frameworks that make countries choose between a Western AI ecosystem and a Chinese one.

This bloc is probably the most flexible in terms of negotiating position. Its members have enough capacity to strike deals with both the Innovation-First bloc and the Access and Equity

bloc, priming them to be potential bridge-builders in the committee debate. Technology transfer provisions would help such states since they would benefit from more open access to frontier models and tools, while supporting intellectual property frameworks would protect their own emerging AI industries. Delegates in this bloc should be prepared to explain both what they need from wealthier AI powers and what they can offer to less-developed countries in return.

Committee Mission

The United Nations Commission on Science and Technology for Development (CSTD) was established in 1992 as the UN's primary intergovernmental forum for issues at the intersection of technology and development. The Commission is composed of 43 member states elected by the Economic and Social Council (ECOSOC) and meets annually in Geneva. Its purpose is to provide ECOSOC and the United Nations General Assembly with high-level analysis and policy recommendations on technology issues, with particular attention to the challenges and opportunities facing developing countries.

The CSTD is uniquely suited to tackle the topic of the AI divide. It is one of the few UN bodies explicitly mandated to examine frontier technologies such as AI from the perspective of their impact on development, equity, and the ability of all countries to participate in technological progress.⁶² CSTD sessions so far have already engaged with AI, data governance, and digital inequality. This is a committee with real convening authority and a track record of producing recommendations that shape international technology policy.

At the same time, delegates should be clear-eyed about the CSTD's limits. Remember that it is an advisory body: unable to enact binding law, force technology transfers, or compel governments to change its trade or regulatory frameworks. What

it can do is create consensus recommendations that carry political weight, provide a neutral space for dialogue between different states, and identify concrete capacity-building measures.⁶³

The most productive debates in this committee will not be about whether the AI divide exists, since the evidence that it is real and growing is substantial. Rather, they will be about what the international community is actually willing to do about it. Productive resolutions will move beyond general calls for cooperation and propose specific mechanisms, such as a funded multilateral compute pool that lower-income countries can apply to access, structured technology licensing programs, and requirements that UN-funded AI tools support local languages. Delegates should consider the following questions for every proposal: who would administer it, how would progress be measured, and why would participating states agree?

TOPIC B

CSTD | NHSMUN 2027

Sustainable Extraction of Critical Minerals



Photo Credit: Julien Harneis

Introduction

Energy production and storage is moving away from traditional methods using fossil fuels. Instead, more sustainable forms of energy are becoming more commonly used. However, new infrastructure and technology are needed to make this transition possible. Much of this technology relies on critical minerals, also known as “energy transition minerals” (ETMs).⁶⁴ Many ETMs have unique properties and play key roles in batteries and other equipment. They can not be easily replaced with other materials. However, many ETMs are not commonly found and can be hard to produce.⁶⁵

Many obstacles stand in the way of large-scale mining of critical minerals. For instance, the production of critical minerals can often have extremely harmful effects on the environment. These effects start from the initial mining. Huge areas of local environments must be cleared to make room for the mines. Heavy amounts of greenhouse gases are also produced along the way. This continues through transport, refinement, and in the creation of the final products once the minerals are ready for use.⁶⁶ There are many other negative effects of mining on the environment, and they are most strongly felt in local communities around the mines. Vital food and water infrastructure may be polluted, making living conditions very difficult for local populations.⁶⁷ Even so, local communities cannot simply get rid of the mines. Mining is often a very important part of local economies.⁶⁸ It is important to find a balance between these dimensions to make mining more safe and sustainable for all.

Further, even though critical minerals can have very positive effects, this is not always felt in the regions where they were mined. Many critical minerals are found in small regions throughout the world. However, as soon as they are mined, they are shipped abroad for processing and sold in foreign markets.⁶⁹ As a result, local communities often receive all of the negative effects without any of the benefits. Some countries have begun to adopt new policies to eliminate waste and recycle existing products to

become more self-sufficient. At the same time, some producers have tried to increase efforts to process materials domestically rather than shipping the raw minerals abroad. However, these are both slow transitions that require time and infrastructure to develop, and may not be able to keep up with long-term demand.⁷⁰

As the demand for critical minerals increases, countries must also contend with corporations that seek to maximize their profit at all costs. To keep up with this demand, many mining operations sacrifice worker safety and violate legal requirements to keep production high. However, many countries struggle to enforce regulations, so corporations are able to get away with it.⁷¹ At the same time, many critical minerals are controlled by companies that can establish monopolies over the market. Information about the market is not maintained well, so a few corporations are able to completely control the costs and availability of these important materials. This influence can also affect global politics. One country's trade policies or embargoes can cut off the entire world from these materials, giving them immense power.

History and Description of the Issue

THE GREEN WINDOW OF OPPORTUNITY

The global shift away from fossil fuels and toward clean energy has increased the demand for “energy transition minerals” (ETMs), such as copper, lithium, nickel, and cobalt. ETMs are vital components of the modern technology used to make and use clean energy. This includes wind turbines, solar panels, electric cars, and many types of batteries. The International Energy Agency (IEA) projects that demand for ETMs could increase sixfold within the next 25 years.⁷² Further, meeting the goals of the Paris Agreement will need more than three billion tons of ETMs. This shift has fundamentally transformed the mining industry by shifting the world’s energy reliance from fuel to minerals. Traditional energy systems have relied on coal, oil and natural gas.⁷³ But as governments continue to push green initiatives, the energy sector has evolved into the fastest growing driver of global mineral demand.⁷⁴

With increased demand for minerals, developing

countries are in a unique position. Currently, the African continent holds over a fifth of the world’s metallic minerals key to production of solar panels, batteries, and electric vehicles.⁷⁵ According to the UN Commission on Trade and Development (UNCTAD), the African continent contains 48 percent of the world’s cobalt and manganese, as well as 22 percent of natural graphite.⁷⁶ These resources are key to building electric vehicles. Some mineral-rich African countries also face political instability, which can make mining and mineral transport more difficult to govern. In some cases, extremist and armed groups take advantage of this to smuggle critical minerals across borders.⁷⁷

For example, the Rubaya mines are a major asset in the Democratic Republic of the Congo (DRC). This site is important because it produces 20-30 percent of the world’s supply of coltan.⁷⁸ Coltan is an ore that can be processed to produce tantalum, a key metal used in medical equipment and defense applications.⁷⁹ Thus, when the DRC’s Congo River Alliance (AFC) led an insurrection, it immediately took control of the Rubaya mining site.⁸⁰ Under the AFC, almost 150 tons of illicit coltan are shipped fraudulently to Rwanda every month, where it is combined with



Coal Train Nacala

Credit: Matthias Hille

the domestic supply.⁸¹ When the supplies are mixed, it becomes impossible to trace.

However, the growing importance of minerals has also given many states a chance to catch up to more developed countries. A green window of opportunity is a period with favorable conditions for developing countries to improve and expand their clean energy infrastructure.⁸² One example came from cooperation between the governments of Malawi, Zambia, and Mozambique, with support from Japanese and African investors. Since the early 2000s, the three African countries have developed the Nacala Corridor, a regional transport network originally developed for coal exports that could also support critical mineral trade. For Japan and its African partners, improving transport offers one way to diversify mineral supply chains while creating opportunities for local trade and industry.⁸³

To bring the project to life, Japanese and African public and private partners, along with development banks, supported rail and other transport infrastructure. They aimed to connect the landlocked countries, Zambia and Malawi, to Mozambique's Indian Ocean port in Nacala. Using railroads, critical minerals could be transported more efficiently throughout the region. Further, one-stop border posts allow cargo to be monitored and documented. Such oversight could help reduce smuggling, tax evasion, and illicit trade.⁸⁴ The corridor already supports broader regional trade, including agricultural exports, while its role in critical mineral supply chains is still developing. Japan could benefit from more diversified mineral supply chains.⁸⁵

For the African partner countries, improved transport could support trade, employment, and future mineral processing. Similar infrastructure could also be used for other industries beyond minerals, helping to further development as a whole in the region.⁸⁶

Other regional partnership efforts have also been effective in Africa. To tap into the value chain of the clean energy sector, Zambia and the DRC have also partnered to form a transboundary battery and electric vehicle economic zone.⁸⁷ This zone would stretch across both countries and have shared policies to promote cooperation and development of these technologies. The highest political offices in both countries support this initiative. In March 2023, Afreximbank and the Economic Commission for Africa (ECA), requested a prefeasibility study from experts. The report found that both countries sit on 70 percent of the required materials for this plan.⁸⁸ In the workshops that followed the announcement of the report, stakeholders began creating ways of producing battery precursors and batteries.

Latin American countries also contain vast amounts of critical minerals. The Lithium Triangle – Argentina, Chile, and Bolivia – currently sits on 60 percent of the world's lithium resources.⁸⁹ In Chile, lithium extraction is reserved for the state, state-owned enterprises, or private companies operating under specially approved contracts. On April 20, 2023, Chilean President Gabriel Boric announced the National Lithium Strategy. In response to growing demand for lithium, this plan aimed at joining public and private sectors to speed up critical mineral extraction. The state-owned copper company

The Nacala Corridor shows how investments can serve industries while laying the groundwork for a more diverse critical mineral supply chain.

Codelco and the Chilean company Sociedad Química y Minera de Chile (SQM) were the main partners of this strategy. The two entities formed an agreement where Codelco would have a controlling interest in mining operations while SQM managed production until 2030, after which Codelco would take over management. The mining would mainly take place in Salar de Atacama, which contains over 90 percent of Chile's lithium reserves.⁹⁰

Highlighting another example in Latin America, Argentina has made numerous advances in the realm of critical mineral extraction. Following the 2023 election of Argentine President Javier Milei, Argentina has bolstered the regulatory framework to increase investment in the critical mineral sector.⁹¹ Argentina has guaranteed tax and customs assistance for any projects that exceed USD 200 million. Argentina is also the only country in the Lithium Triangle that allows private companies to own and commercialize lithium resources; Chile and Bolivia permit private participation but maintain greater state control over lithium development.⁹²

Bolivia is trying to attract more foreign investment in its critical minerals sector and build closer economic ties with Western countries. Bolivia has the world's largest lithium resources, as well as the ninth largest silver reserves, along with significant tin deposits. These minerals are important for technologies such as electric vehicle batteries, solar panels, electronics, and some military equipment. The government has proposed policies such as tax incentives, faster approval processes, and updated mining regulations to encourage new mining projects. This could help Bolivia become a larger supplier of critical minerals at a time when countries such as the US are seeking to reduce their dependence on China and Russia for these resources.⁹³

Despite the large steps that developing countries have taken to be a part of this new green era, there are social and environmental issues that need to be addressed. The mining of lithium

in Salar de Atacama has been linked to an estimated 30 percent reduction in water levels, affecting nearby ecosystems and Indigenous communities.⁹⁴ Even though the Chilean Supreme Court mandated the Indigenous communities be consulted on activities that might affect their livelihood, critics say they have often been excluded from meaningful decisions.⁹⁵ In 2018, CORFO facilitated an agreement between SQM and 18 Indigenous communities that allowed SQM to expand lithium production. The agreement included an average 30 percent royalty shared between the Chilean state and participating communities. Critics argue that this agreement did not solve the crisis and that Indigenous communities still have little influence over what happens to them.⁹⁶ As some mineral-rich countries seek greater control over their resources, they must also protect the communities and environments affected by extraction.

MINING AND THE ENVIRONMENT

One major problem in ETM mining is pollution, especially greenhouse gas (GHG) emissions. The mining industry has historically contributed to about 10 percent of global GHG emissions annually.⁹⁷ ETM mining generates fewer emissions than other mining practices because they are mined in small batches, but demand is rising fast, so the total emissions from ETM mining as a whole are rising.⁹⁸

Mining is not the only source of pollution associated with ETMs. Processing, smelting, making products, and transport all use large amounts of energy. As demand grows, companies scramble to maximize their production and profit, leading to less energy-efficient methods. For example, lithium is now often made from hard rock instead of its old brine-based recovery. While this new process is faster, it also creates three times more emissions than older methods. Additionally, many companies now use other forms of lithium to make their batteries, such as lithium hydroxide. While this can be more

effective in some cases, it also results in more emissions. Similarly, nickel production is moving to laterite ores, but these ores need more energy and therefore create more emissions.⁹⁹

ETMs are still very important in lowering emissions overall. As such, one way to address this is considering ways to lower pollution from processing ETMs. For example, companies can try to move away from more harmful forms of energy in processing, such as coal and oil. Instead, they can use low-carbon electricity that generates fewer emissions.¹⁰⁰ This change is a process known as “fuel switching.”¹⁰¹ Companies have begun to take action. Over two-thirds of the top 20 mining companies have set reduction targets for 2030.¹⁰²

The development of mines can bring great opportunities to largely underdeveloped regions. However, they can also wreak havoc on the land they inhabit. Mining potentially influences roughly 37 percent of the world’s surface, excluding oceans and Antarctica.¹⁰³ This area also includes land up to 50 km away from mining projects. This vast stretch is because of issues like runoff, infrastructure, and waste that extend beyond the mines themselves. Additionally, around 82 percent of mining operations are “critical mines”

for ETMs and other critical minerals. Critical mining areas often contain up to five times more mines than traditional targets.¹⁰⁴

These dense operations and the increasing demand for these minerals have caused environmental land issues at an alarming rate. A report from the World Resources Initiative (WRI) revealed that from 2001 to 2020, mining led to the loss of 1.4 million hectares of forest cover. However, 87 percent of this loss came from only 11 countries whose environments have been ravaged by mining. In addition, mining often extends into protected areas. This same study found that 150,000 hectares of protected forest land were destroyed as well.¹⁰⁵ Out of all mining industries, cobalt and copper, two critical minerals, were found to cause the highest rates of deforestation.¹⁰⁶ However, the mine itself is just the start. Critical mines also often see high levels of deforestation. This additional deforestation is often the bigger threat.¹⁰⁷

Mine waste is another highly dangerous byproduct from mining. Mine wastes, also known as tailings, contain toxic contaminants like arsenic, mercury, and iron sulfide that mix with the air, water, and earth. This creates acidic drainage that can flow into both the soil and

Aftermath of Brumadinho dam collapse

Credit: Ibama



waterways.¹⁰⁸ The poor management of mine waste can have long-lasting impacts. When stored on land, tailings are often stored behind dams. In 2019, the Brumadinho dam, a mining waste tailings dam in Brazil, collapsed. This caused a mudslide that killed over 240 people and destroyed nearby ecosystems.¹⁰⁹ This incident highlights the need for better waste management to minimize the environmental impacts and prevent similar accidents. Some stricter international regulations have been placed on mines, but tailing is still a major problem for many developing countries where artisanal mining happens. Many of these projects are kept off-record and fail to meet these regulations. These unsafe practices lead to higher rates of pollution from waste in their regions.¹¹⁰

Mining also puts pressure on water supplies. There are two main reasons for this. Firstly, chemical runoff can pollute nearby water sources. Sometimes, these sources may be the only ones available for neighboring communities. Secondly, mining also uses a lot of water for ore processing, cooling machines, and controlling dust. The WRI reports that 16 percent of the world's critical mines and reserves are in areas with high water stress.¹¹¹ Some stages of mining can reuse water. But other stages, like dust control, will pollute the water and prevent it from being reused.¹¹² As demand for ETMs drives more mining and processing, water shortages in these areas could worsen without better protections.

In short, mining and processing ETMs can cause severe, lasting damage to the environment. As countries expand clean energy production,

they must also address the environmental damage caused by extracting the minerals these technologies require.

FROM MINE TO MARKET

In addition to environmental sustainability, the economic stability of this industry is also important to consider. The critical mineral industry is highly complex, as minerals must go through several stages of production. Minerals must be mined, processed, and integrated into components before they can be used in finished products. However, each of these stages is largely disconnected from the rest. Mining, processing, and manufacturing often take place in different countries and require different technologies, so minerals and components must be transported between facilities.¹¹³ This complexity means that the supply chain is very vulnerable, as disruption to a single stage can cause the entire market to collapse. Each stage faces its own unique types of challenges, so large-scale regulation and stability are very difficult to achieve.¹¹⁴

The Democratic Republic of the Congo supplied over 74 percent of the world's cobalt.¹¹⁵ Meanwhile, nearly 86 percent of lithium comes from either Australia, Chile, or China.¹¹⁶ As such, their localized impacts are concentrated largely within these resource-rich regions.¹¹⁷ However, these countries do not always feel the benefits of the industry. After the minerals are mined, they are exported to be refined and assembled into the end products elsewhere. By the time they reach their final destination, products are often

Due to the locations of mineral deposits, mining is often concentrated within a few resource-rich regions.

far from their materials' origins.¹¹⁸ As a result, it becomes much more difficult for the source countries to acquire the final products that are ready to be put into use. This contributes to a “decarbonization divide,” where more developed countries reap the benefits of new technology at the expense of developing countries where the materials came from.¹¹⁹

Additionally, the market for critical minerals is highly volatile. One reason is that the critical mineral market is far less transparent than oil or coal markets. There are significant data gaps, meaning information on reserves, production, and inventories is often limited or delayed.¹²⁰ Reporting varies across countries and companies, and production figures must be collected and checked before they appear in international datasets. As a result, published figures may describe the previous year rather than current supply. This makes it harder to understand the current supply and predict future market conditions. Many critical minerals are also sold through private contracts between buyers and producers, and the terms of these agreements are usually confidential. This makes price discovery more difficult.¹²¹

Long development timelines also play a role in the market. From the time a mineral deposit is discovered, it can take more than 16 years to start production.¹²² Because the new supply takes so long to develop, production cannot quickly respond to increases in demand. This can contribute to further price volatility. Finally, many critical minerals are produced as byproducts of other minerals. Their supply therefore depends partly on the production of the main mineral being mined. For example, cobalt is often a byproduct of copper mining. This means that the supply of cobalt depends on the demand for copper.¹²³ As a result, the critical mineral supply is more difficult to predict. Overall, the inconsistencies in predicting supply can lead to market instability.

In addition to market instability, the critical mineral supply chain is full of monopolies.

Midstream processing, including refining and smelting, is even more geographically concentrated than mining. China dominates this point of production. Right now, China refines roughly 91 percent of the world's rare earth elements and over 90 percent of its graphite, a separate critical mineral used in batteries. Even as other countries try to catch up, China is still projected to process 77 percent of global output by 2030.¹²⁴ Further, some companies own or control both mines and refineries. This allows them to coordinate multiple stages of their supply chains, from mining raw minerals to selling the refined products. This is known as vertical integration. It can give those companies more influence over production and sales, while countries that host major refining industries may gain leverage in trade negotiations.

When one country has concentrated control over an entire market, they can attempt to use it as leverage. China has not been afraid to use this power in the past. In 2010, China placed a temporary embargo on rare earth mineral (REM) exports to Japan during a territorial dispute. However, this led to a spike in REM prices around the world, not just in Japan. This led many countries to try to reduce their reliance on China. This shows how a monopoly on the market can have rippling effects on the global economy. Today, this problem is still highly relevant. In 2025, Beijing introduced new restrictions on the export of technologies used to process REMs.¹²⁵ These new policies could have a similar impact on the market as their previous policy.

The critical mineral industry is highly complicated, but it is essential to technology and development around the world. Today, many of the systems in place are designed to maximize the benefits for one specific country or corporation, often at the expense of the rest. However, this makes the supply chain fragile, and a slowdown at any stage can bring down the entire industry. It is extremely important to be able to rebuild systems and regulations to stabilize the entire industry at every stage.¹²⁶

THE HUMAN COST OF EXTRACTION

As demand increases for ETMs, companies look for ways to maximize their profit. Large multinational corporations may also look to avoid accountability. In mineral-rich regions, they may rely on subcontracting and informal labor markets. They can exploit loopholes in regulations and bribe officials to get away with labor violations.¹²⁷ However, mining also takes place outside these large corporate operations. Many smaller communities are built around independent mines run by individuals or small groups. These operations are known as artisanal and small-scale mining (ASM). Around 45 million people work directly in artisanal and small-scale mining worldwide, while an estimated 270 million others depend on the sector for their livelihoods. Often born out of desperation, ASM is the backbone of the world's green energy shift. ASM provides as much as 20 percent of the world's mineral supply.¹²⁸

Instead of using advanced machinery, artisanal miners use simple tools like picks and shovels to dig as far as 40 meters deep. This work is highly labor-intensive and often done by untrained workers. Because many operations lack effective

oversight, miners may work without adequate safety protections and face serious risks to their health.¹²⁹ Workers can also be exploited by traders who buy their minerals and sell them further along the supply chain.¹³⁰

The effects of mining extend beyond the regions they inhabit, often heavily impacting the communities around them. In some regions, mining contributes greatly to community and infrastructure development. It also helps to enhance social and cultural identity. However, mining operations often violate regulations set by the International Labor Organization (ILO), as well as basic human rights. This is especially true in developing countries. This problem is especially evident when it comes to workers' rights. Between 2010 and 2020, the Business and Human Rights Resource Centre recorded over 200 human rights violations. The solar panel industry alone contributed to 44 percent of these.¹³¹ Mining operations can be linked to unsafe working conditions, child or forced labor, and harm to nearby communities through pollution, displacement, or inadequate consultation. These risks affect workers and residents in different ways. However, this is only projected to get worse. To reach the European



Man cleaning solar panels

Credit: Deo photographer

Union's climate goals, ETM mining could expose between 15,000 and 89,000 African miners to modern slavery by 2040.¹³²

These human rights violations often affect vulnerable communities. One example is the Uyghur population in Xinjiang, China. Xinjiang has been a major center of polysilicon production for solar panels. Reports have raised concerns that Uyghurs have been subjected to alleged forced labor in the solar supply chain under arduous conditions, including long hours, physical abuse, and little or no pay.¹³³ In many countries in the Global South, women are often excluded from formal mining jobs and instead work in ASM, which can be dangerous and poorly regulated. Mining communities can also be unsafe because of temporary settlements, male-dominated work environments, and weak security. These conditions can increase the risk of sexual violence, human trafficking, and forced labor.¹³⁴

In Zambia, children have reportedly worked in dangerous mines, sometimes with little protective equipment, limited access to food and sanitation, and exposure to verbal and physical abuse. Many families are so impoverished that they feel forced to send their children to work instead of facing starvation.¹³⁵ The US Department of Labor has found that forced labor is also a problem in the supply chains of critical minerals from countries including Indonesia, China, South Korea, and the Democratic Republic of the Congo (DRC).¹³⁶

In some regions, physical violence and human rights concerns are common in mining communities. In Colombia, some mines in the Guiana Shield region have reportedly come under the control or influence of criminal and armed groups. In some cases, these groups have operated alongside corrupt officials and businesses involved in the mining sector. Reports have documented serious abuses, including unlawful killings, child labor, sexual violence, torture, disappearances, displacement, and forced confinement. Similar concerns have been reported in parts of Brazil and Venezuela. Governments in the region have faced challenges

in preventing illegal mining and protecting workers and local communities. In southern Venezuela, Colombia's National Liberation Army (ELN) has reportedly become involved in illegal mining and extortion. When government authorities are unable to effectively regulate these areas, workers and local communities may be left vulnerable to violence, exploitation, and other human rights abuses.¹³⁷

Current Status

CORPORATE ACCOUNTABILITY

With demand skyrocketing, companies are scrambling to meet expectations. Between 2017 and 2022, the market for critical minerals doubled in size.¹³⁸ This highlights the strategic importance of the materials, along with the growing pressure to produce. Many resort to questionable methods of mining that have put them under international scrutiny. The DRC in particular is home to about USD 24 trillion in untapped mineral wealth.¹³⁹ That wealth has made the country central to the global minerals trade. It has also made the DRC a site of conflict, corruption, and human rights abuses.¹⁴⁰

One of the most significant developments has been the rise of lawsuits against major tech companies. These lawsuits are mainly over their sourcing of Congolese cobalt. In 2019, the five giants of tech – Apple, Google, Dell, Microsoft, and Tesla – faced a landmark case that alleged the companies knowingly benefited from cobalt mined by children working in dangerous artisanal mines in the DRC.¹⁴¹ While many legal claims were eventually dismissed, the lawsuit set a precedent. It was the first case to test whether multinational corporations could be held liable for human rights abuses buried deep in their supply chains.¹⁴²

Apple in particular has remained at the center of this debate through more legal setbacks. In 2026, consumer protection lawsuits filed in Washington D.C. accused the company of

misleading consumers. They advertised their products as “responsibly sourced” even though their cobalt was linked to child and forced labor.¹⁴³ At the same time, the government of the DRC filed criminal complaints against Apple subsidiaries in France and Belgium. The complaints alleged covering up war crimes, laundering tin, tantalum, and tungsten sourced from armed-group-controlled mines in eastern Congo, and using deceptive marketing to claim clean supply chains.¹⁴⁴ While Apple has denied these allegations and maintains that it tracks its suppliers, these cases reflect a broader trend within the industry.¹⁴⁵ Rather than accepting the crimes committed in the name of meeting demand, countries and communities are fighting back.

There have also been environmental concerns within corporate mining. One of the largest group actions involves BHP and the 2015 Fundao dam collapse in Brazil, which caused deaths, injuries, and extensive environmental damage.¹⁴⁶ More than 600,000 Brazilian people, businesses and municipalities brought claims in the English High Court seeking approximately GBP 36 billion in damages. In November 2025, the court found BHP liable under Brazilian law, both because

it qualified as a “polluter” subject to strict environmental liability and because its conduct contributed to the collapse. BHP is appealing the judgment, and the amount of damages remains to be determined.¹⁴⁷

There have been similar concerns in Zambia too. Copper production has increased alongside growing environmental scrutiny. In 2025, a tailings dam operated by Sino-Metals Leach (SML) collapsed.¹⁴⁸ Local farmers soon filed lawsuits seeking over USD 220 million in damages as acidic mining waste had contaminated the Kafue River. Reports showed that the spill spread toxic substances like arsenic, cyanide and uranium. The contamination from these compounds threatened the local drinking water, agriculture and fisheries. The incident reignited environmental scrutiny of mining companies, including Moxico Resources and Rongxing Investments, both of which have faced allegations of improper waste disposal and resulting environmental contamination.¹⁴⁹

These lawsuits have helped shape the evolving regulatory landscape. The United States enforces Section 1502 of the Dodd-Frank Act. This requires publicly traded companies to disclose their use of conflict minerals from



*Detecting Mining Sites in Guyana
with Machine Learning*

Credit: Wanmei Liang

countries like the DRC.¹⁵⁰ Similarly, the EU's Conflict Minerals Regulation (EU 2017/821) has importers of tin, tantalum, tungsten, and gold conduct due diligence to ensure purchases do not finance armed conflict or contribute to human rights violations.¹⁵¹ Zambia has its Local Content Regulations that requires mining companies to allocate 40 percent of procurement to local businesses.¹⁵² This specifically reflects a broader trend away from resource nationalism and puts power back to the mineral-producing states. These movements reflect the government's role in regulating the multinational corporations that run the global supply chain. To support the global energy transition, states must also protect human rights, strengthen environmental safeguards, and establish effective methods for holding third parties accountable.

AI'S ROLE IN SHAPING THE CRITICAL MINERAL LANDSCAPE

The global chase for critical minerals has entered a new phase. With the clean energy transition and the artificial intelligence (AI) revolution, the international resource landscape began to reshape.¹⁵³ As a result, the mining sector is undergoing a transformation known as Mining 4.0.¹⁵⁴ This is where AI, automation, robots, and advanced data analytics are involved in every stage of the mineral supply chain. Unlike traditional mining methods that rely heavily on human interpretation and manual labor, AI systems can analyze enormous amounts of geological, operational, and environmental data. This is all to support faster decision-making

under certain conditions.¹⁵⁵ Within governments looking for reliable access to responsible critical minerals, AI has emerged as the potential tool to increase production, improve sustainability, and reduce weaknesses within the global supply chain.

One of the most significant impacts of AI in mining is its ability to completely transform mineral exploration. Historically, discovering new deposits required years of geological surveys, expensive drilling, and huge financial risks that slowed down the whole process. But AI models can now process decades of geological records, satellite imagery, and seismic data to identify patterns that may go overlooked by human researchers.¹⁵⁶ This technology is especially important for finding more under-cover mineral deposits. These are often located beneath layers of rock or overlooked areas. AI-assisted exploration has contributed to discoveries such as the Mingomba copper project in Zambia. In this project, advanced geological analysis helped identify one of the world's most promising new copper deposits. By improving the accuracy of exploration, AI could reduce the number of unsuccessful drilling projects and shorten the traditional 10 to 15 year timeline between discovery and commercial production.¹⁵⁷ Countries that previously lacked surveying capabilities may now be able to use AI technologies to identify new deposits and increase their bargaining power in the international mineral market.

AI is also transforming daily mining operations through autonomous equipment and real-time decision-making systems. Major mining

As countries increase efforts to meet climate goals and expand digital infrastructure, the demand for resources continues to skyrocket.

companies have begun adopting autonomous haulage systems (AHS), robotic drilling equipment, and remote operation centers that allow machines to perform dangerous tasks with less human involvement. These technologies have been found to improve productivity by up to 30 percent.¹⁵⁸ Autonomous trucks and drilling systems can optimize routes, reduce downtime, and operate in conditions that may be unsafe for human workers.¹⁵⁹ Remote operation centers can also reduce the number of workers exposed to hazardous conditions, potentially improving workplace safety and reducing concerns about accidents and related legal claims. AI-powered sensors provide another layer of operational control by collecting real-time information about equipment and geological conditions. Companies can use this information to adjust excavation strategies, monitor machinery for potential failures, and improve resource recovery rates. However, automation also raises concerns about employment. ASM provides an important source of income for many mineral-rich communities. As mining processes become more automated, some ASM workers may lose their jobs or face reduced employment opportunities. For this reason, the transition to automation must be managed carefully, with attention to worker training and employment opportunities as the mining industry becomes increasingly technology-driven.¹⁶⁰

After minerals are mined, they must be separated from waste material and, in many cases, refined before manufacturers can use them. Processing and refining are important points of vulnerability because capacity is concentrated in relatively few countries. Many countries have valuable mineral deposits, but lack the infrastructure needed to refine raw materials locally. AI can improve some processing decisions, but it cannot replace the investment needed to build refining facilities. For example, some sorting systems use sensors and computer vision to identify mineral-bearing rock and remove waste rock before the remaining material enters a processing plant. This can reduce the amount of material that must

be transported and processed. Implementing such advanced ore sorting technologies can reduce transportation and processing costs by 20-30 percent, translating to annual savings of USD 5-10 million for a medium-sized mine processing 10,000 tons per day.¹⁶¹

With AI revolutionizing the critical mineral industry, there is a rare opportunity for mineral rich countries to find more economic success with their natural resources. Rather than staying simply as suppliers, states can use AI to limit the economic risks associated with developing more domestic industry.¹⁶²

KEEPING IT CIRCULAR

To combat the harmful impacts of the mining industry, there has been a move toward circular economies. Circular economies are models that make the “take-make-waste” model more sustainable.¹⁶³ They try to reduce reliance on critical minerals and promote responsible mining investments. This model is based on reducing waste, keeping materials in use for longer, and restoring natural systems.¹⁶⁴ Many circular strategies focus on finished products, such as repairing electronics or recycling batteries.¹⁶⁵ Mining occurs earlier in the supply chain, so its role includes reducing waste during extraction, recovering minerals from mine waste, and reusing water and other materials where possible.

To transition toward circular economies, mining must focus on sustainability. This involves secondary recovery and urban mining, which taps into used materials rather than relying on new materials.¹⁶⁶ This includes discarded end-use products and waste made during refining. For example, collecting and recycling copper from discarded products could return an estimated nine million tons of copper to the supply chain. This is worth more than USD 110 billion.¹⁶⁷ Similarly, some mine waste can be processed and used in place of sand or gravel in construction, provided it meets safety standards. Research from Stamp Sands in Baraga Bay, Michigan found that copper tailings can be

recycled into concrete parts.¹⁶⁸ Concrete helps lessen environmental impacts like acid rock drainage and groundwater contamination.¹⁶⁹ Growing these recycling initiatives help meet needs created by the mining industry. Recovered materials from end-of-life batteries could also potentially meet 30 percent of Europe's demand for lithium, cobalt, and nickel by 2040.¹⁷⁰

While recycling is important, products can often be used for longer before they need to be recycled. They can be reused, repaired, or refurbished instead of being broken down into raw materials. A component that no longer meets the requirements of its original use may also be repurposed for a less demanding one. For example, EV batteries are a driving force in critical mining demand. Once they have reached the end of their automotive life, they can be repurposed as power system backups. This extends their useful lifespan by 5-10 years.¹⁷¹

The drive for circularity is pushed by the need for geopolitical resilience in the critical mining industry. The global supply for critical minerals is highly concentrated. Many advanced economies, like the United States, are heavily dependent on critical minerals. China controls 60 percent of the critical minerals supplied to the US.¹⁷² By

using secondary recovery, states can create a domestic supply chain. This reduces their vulnerability to foreign embargos or export bans.¹⁷³ With tensions between states rising and global markets tightening, economic sovereignty and supply chain diversification have become more important than ever. The African Green Minerals Strategy also uses circular principles to shift the continent from a raw material supplier to a value creator.¹⁷⁴ This is through processing minerals locally and escaping the cycle of foreign dependency.

The global implementation of circular economies has many economic barriers. Recycling some critical minerals can cost more than obtaining newly mined material because discarded products must be collected, sorted, and processed before the minerals can be recovered. Costs are especially high when products are difficult to take apart or too few are available for recycling at scale. But that cost comparison does not account for the environmental damage and social harm caused by primary mining, costs that mining companies do not currently have to pay. If governments required those costs to be included in the price of newly mined minerals, recycling would become far more competitive.¹⁷⁵ Another

Minerals Recycling Plant

Credit: David Dixon



major issue facing these programs is that current technologies, like EV batteries and wind turbines, are not designed for easy material recovery.¹⁷⁶ So to scale circularity, there would likely need to be a shift in product design. For example, Quick-Release binders in batteries can replace welds in screws and allow for more cost-effective disassembly.¹⁷⁷

While circular economy strategies are critical for reducing the resource demand, they cannot entirely replace primary mining. Existing stocks of mined materials are too small to cover demand and current resources are held in use for long periods of time.¹⁷⁸ Extracting virgin materials will remain necessary for the foreseeable future, since too many current technologies depend on it. Some supporters of circular economies argue that ending raw material mining entirely should be the ultimate goal. For now, though, circular economy strategies serve a more modest purpose: reducing overall demand and promoting more sustainable mining practices.

Bloc Analysis

Demand for critical minerals is surging, and the competition to secure them has moved well beyond a commercial issue into one shaped by geopolitics, national security, and economic policy.¹⁷⁹ These minerals are no longer viewed as inputs for renewable energy, electric vehicles, and digital infrastructure. They are strategic assets that shape a country's technological independence and economic security. The Center for Strategic and International Studies calls the result a "multipolar muddle," where many countries compete and depend on each other at the same time, rather than facing off in a simple two-way rivalry.¹⁸⁰ That demand is expected to climb sharply. A 2020 World Bank report found that production of graphite, lithium, and cobalt alone would need to increase by nearly 500 percent by 2050, compared to 2018 levels, to meet demand from clean energy technologies.¹⁸¹ Yet sharp divisions remain over who bears

the financial burden of the supply chain's diversification.¹⁸² Part of this burden is what analysts call the "resiliency premium." This is the added cost of building new mines, processing facilities, and transport networks so a country is not dependent on a few dominant suppliers, even if depending on them would be cheaper.¹⁸³

In response, some governments have turned to industrial policy, investment incentives, export controls, and other trade measures to secure access to critical minerals.¹⁸⁴ Export restrictions have especially increased, multiplying fivefold since 2009 according to the OECD.¹⁸⁵ Controls expand as countries attempt to protect their increasingly valuable resources and gain more control over their own supply chains. This reflects a larger trend called resource nationalism, where countries prioritize securing their own access to key materials over relying on global markets. China sits at the center of these tensions.¹⁸⁶ This level of control has pushed other countries to pursue their own strategies, and the world is increasingly splitting based on who controls access to these materials.

SEEKING RESOURCE SOVEREIGNTY FOR PRODUCERS

Mineral-rich countries, primarily in the Global South, are pushing for more balance of power in the raw materials market.¹⁸⁷ Rather than remaining passive suppliers, these countries are working to become active participants in the supply chain by increasing their own domestic processing, manufacturing, and technological capabilities. For decades, resource-rich states have exported unprocessed ores at low prices while receiving only a small share of the profits. At the same time, these states bear much of the burden, as their people and environment suffer from mining. This pattern has contributed to what many describe as the "resource curse," where states with plentiful natural resources but limited infrastructure remain dependent on exporting raw goods rather than developing industry. Sovereignty over the value chain is increasingly

seen as the only way to capture proper returns from these resources. The logic behind this shift is to use the window of opportunity from the green transition to turn natural deposits into lasting industrial capital.¹⁸⁸

To achieve this, governments have adopted several policy tools. One major strategy is restricting exports. Indonesia has set a precedent by banning nickel exports to encourage domestic refining and manufacturing.¹⁸⁹ Countries like Zimbabwe and Namibia have applied similar restrictions to raw lithium exports.¹⁹⁰ Other countries have taken a more aggressive approach by restructuring their mining sectors entirely, renegotiating contracts, increasing state ownership, and applying regulatory pressure. The DRC, for example, revised agreements with foreign mining companies.¹⁹¹ Furthermore, Bolivia and Chile expanded state involvement across their mining industries.¹⁹² Many countries have also implemented fiscal policies designed to secure a larger share of profits from their resources.¹⁹³ Together, these strategies have formed a collective effort by resource-rich countries to shift from simply being suppliers that export all raw materials to influential players in the global critical mineral market.

FOR SUPPLY CHAIN SECURITY

Led by the G7 and OECD countries, this bloc seeks to “de-risk” the global critical mineral supply chain. While countries in this group are some of the biggest consumers of critical minerals, they acknowledge the monopoly over the market and have coordinated efforts to build a more secure and diversified supply chain.¹⁹⁴ Therefore, these countries have developed friend-shoring as a strategic economic policy. Friend-shoring involves countries relocating their mineral production and processing operations to more politically aligned jurisdictions.¹⁹⁵ The primary motivation of the bloc is the concentration over refining that China has. Countries in this bloc view this monopoly as a national security threat because of China’s

willingness to turn off the tap for political leverage, as seen in the 2010 rare earth ban on Japan.¹⁹⁶ Rather than simply ending trade with China, states are looking to de-risk their mineral flow by building alternatives among politically trusted partners. Friend-shoring represents a broader shift from a global economy focused on cost efficiency towards one that prioritizes security among the geopolitical climate.¹⁹⁷

While unified in a purpose, members of this bloc have taken various approaches to policy when achieving their desired security. Japan and South Korea have the most mature frameworks, characterized by public-private links. They rely heavily on stockpiling mechanisms and large-scale financing. South Korea alone has committed nearly USD 35.7 billion towards stabilizing their supply chain.¹⁹⁸ The commitment highlights these countries’ desperation for a stable flow of materials. Canada has chosen to focus on building a nationally integrated ecosystem. In this they hope to see materials extracted from a region processed and manufactured either within Canada or a trusted trading partner.¹⁹⁹ Meanwhile, the EU has used the Critical Raw Materials Act (CRMA) to set legal benchmarks to prevent over-reliance.²⁰⁰ For example, no more than 65 percent of any strategic mineral is to come from a single third country by 2030.²⁰¹

Countries also use public financing to attract private investment in critical mineral projects. For example, the UK can guarantee bank loans to overseas mining and processing projects that have agreements to supply UK exporters, while Australia provides government-backed financing for projects within Australia. These measures reduce lenders’ risk and can help projects secure funding.²⁰² Aside from economic policy, the US has established Project Vault, which is essentially a critical mineral reserve, to buffer the private sector against supply shocks like export controls.²⁰³ While domestic efforts have created tension as each country is competing to create their own industries, they share a common goal of diversifying the supply chain for better security

of the market.

RESPONSIBLE MINING

A separate bloc of mineral-rich states have historically captured the least economic benefit from their resources, while bearing the highest social and environmental costs.²⁰⁴ These countries are working to move away from the “predatory” extractive model and toward one centered on sustainable development, community well-being, and environmental integrity. States in this bloc, including Ghana, the Philippines, Peru, and Tanzania, rely heavily on artisanal and small-scale mining (ASM) as a vital source of income. However this practice remains largely unregulated and very hazardous, creating a livelihood dilemma. Globally, an estimated 315 million people depend directly or indirectly on ASM, compared to just seven million people employed in industrial mining.²⁰⁵ These mines serve as a critical economic lifeline for mineral-rich but otherwise impoverished regions.²⁰⁶ Because ASM often happens in regulatory gray zones, workers are trapped in poverty and exposed to horrific conditions. Miners in these regions often work without safety equipment, facing constant risks of cave-ins and are exposed to toxic materials that can cause lifelong disabilities and environmental contamination beyond the mine itself.²⁰⁷

Unlike the other blocs, this group of countries prioritizes the social and environmental consequences of mining alongside its economic value. In Peru, roughly two-thirds of active social conflicts are connected to the mining sector.²⁰⁸ The Philippines has taken direct action in establishing “no-go” zones to protect ecologically sensitive regions.²⁰⁹ To keep mineral wealth local despite implications, they have also mandated 40 percent of mining royalties remain in the producing province. Ghana has adopted a similar Mineral Development Fund for local stakeholders.²¹⁰ Rather than maximizing output, there has been a sustainable push for more community and nature forward outcomes.

Mexico, for example, has adopted mandatory water recycling and land reclamation practices that prevent biodiversity loss.²¹¹ To align with transparency as a competitive edge, countries like Peru and Ghana use disclosure of tax payments and contracts to signal reliability to Western investors.²¹² Together, this bloc seeks to break from historical patterns of exploitation and pursue a more sustainable place in the global critical minerals market.

Committee Mission

The UN Commission on Science and Technology for Development (CSTD) is a branch of the Economic and Social Council (ECOSOC).²¹³ CSTD annually holds a forum to discuss the most pressing technological and scientific issues and their implications for developing countries.²¹⁴ During these forums, the commission produces analysis reports on priority topics, such as artificial intelligence, water sanitation, and the blockchain.²¹⁵ Additionally, the commission is responsible for advising the UN General Assembly and ECOSOC on science, technology, and development.²¹⁶

CSTD also reviews progress on the outcomes of the World Summit on the Information Society (WSIS).²¹⁷ CSTD’s science and technology for development mandate is relevant to critical minerals because access to processing technology, technical skills, and financing can determine whether a mineral-producing country builds local industry or mainly exports raw materials.²¹⁸ For the WSIS, the commission must follow up on regional and international progress on action lines. It must identify obstacles and ways to overcome them to achieve the summit outcomes. Additionally, it facilitates partnerships between states, private and public sectors, and agencies of the United Nations. Its second core mandate is to create recommendations and guidelines aimed at developing countries on science and technologies.²¹⁹

Delegates should recommend practical ways to reduce harm across the mineral supply chain, from mining and refining to manufacturing and recycling. They may consider how to improve worker safety, protect affected communities and water supplies, trace minerals through supply chains, and recover more material from used products. They should also address who will fund processing facilities and training, how producer countries can retain more economic value, and what responsibilities importing countries and companies should share. CSTD cannot enforce these proposals, so delegates should identify which governments, businesses, and UN bodies could carry them out and how progress would be measured.

Research and Preparation Questions

Your dais has prepared the following research and preparation questions as a means of providing guidance for your research process. These questions should be carefully considered, as they embody some of the main critical thought and learning objectives surrounding your topic.

TOPIC A

- 1 How does your country currently use AI in sectors such as healthcare, agriculture, education, government services, and private industry, and which populations have benefited most or remained excluded?
- 2 Does your country develop its own AI models and infrastructure, or does it primarily depend on foreign companies, cloud providers, and open-weight models? What benefits and risks result from this dependence?
- 3 Which barriers, such as computing power, electricity, internet access, financing, technical expertise, local-language data, or AI literacy, most significantly limit AI development and adoption in your country?
- 4 How should the international community increase access to AI without creating dependence on a single foreign government, company, or technological ecosystem?
- 5 What international AI governance initiatives has your country supported, and does it favor binding global rules, voluntary standards, national regulation, or a combination of these approaches?
- 6 What specific programs could the CSTD recommend to narrow the AI divide, and how should those programs be funded, administered, monitored, and adapted to local languages and development needs?

TOPIC B

- 1 What are some possible international and state policies that can reduce pollution generated by the mining of the ETMs?
- 2 What has been done to hold corporations and countries accountable for allowing human right violations in their supply chains?
- 3 In what ways can artificial intelligence aid and/or hinder the transition towards sustainable energy?
- 4 What are some examples of successful (and failed) circular economies that attempted to make critical mining extraction sustainable?
- 5 In what ways does the increase in demand for critical minerals provide developing countries an opportunity to catch up with developed countries?

Important Documents

TOPIC A

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About the Authors

TOPIC A: SONAM WANGCHUK

Sonam Wangchuk was born and raised in Bhutan. He recently graduated from Yale University, where he received a double major in Computer Science & Psychology and Statistics & Data Science. During his college years, Sonam was heavily involved with the Yale Debate Association, competing in both American Parliamentary (where he won Northeastern and semi-finaled Harvard) and British Parliamentary (where he won Vienna, and top spoke Zagreb, JHU, and Berkeley). Sonam currently works at Yale University's Provost Office as a Product Management Fellow, working to transform how data is used across the university in relation to new technological advancements, such as artificial intelligence.

TOPIC B: MIKA SWANSON

Mika Swanson is currently in her second year at the Wentworth Institute of Technology pursuing a degree in Architecture while also being a member of the women's varsity volleyball team. A California native, she has been involved in the Model United Nations community since 2021 competing as a delegate in conferences across North America accumulating numerous accolades primarily dealing with sustainable development. Mika has also served as Chair for her high school's conference and Assistant Director here at NHSMUN in 2025. She is looking forward to eventually pursuing her masters in architecture as a part of her university's 4+1 program in the years to come.

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