Published on *USC Center on Public Diplomacy* (https://uscpublicdiplomacy.org)

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Sep 04, 2025 by Najmedin Meshkati, Bright (Dokyeong) Lee

Beyond Hard and Soft Power: From Gunboat Diplomacy to Engineering Diplomacy, Why and Why Now? [1]

"In a globally interconnected world, countries must learn to collaborate rather than compete for power." (-Professor Joseph Nye)

On May 6th of this year, upon hearing the news of the internationally renowned Harvard University Professor Joseph Nye's passing, I was filled with profound sadness and reflection. In the 20th century, when the world was dominated by the belief that global affairs were governed by a balance of power designed to prevent clashes of force, he emphasized that invisible elements—a nation's cultural capacity and political system—could exert influence on other countries and their peoples without coercion.

The concept of "soft power" that he championed has since shaped global discourse for decades, and people began to believe that the world was starting to operate on the logic of economics and culture rather than the logic of force. During the 30 years since the Cold War ended, major headlines that captured global attention were sometimes dominated by economic growth rates and Academy Awards results rather than casualty counts from accidents or war outcomes. While preventing conflicts worldwide had previously been thought to require simply a physical balance of power, after the emergence of the "soft power" concept, the Golden Arches Theory—that countries with McDonald's don't go to war with each other—gained popularity. This represented a belief that democratic and humanistic values, operating at a higher dimension than conflicts of national interest rooted in power logic, could make the world peaceful.

As technological advancement combined with soft power, the speed at which the world operated constantly accelerated. A world brought closer together by technological development and cultural influence reduced not only physical distances between nations but psychological distances as well. As the range of large aircraft increased daily and free trade systems were established, goods that once took months to import were delivered to consumers worldwide in just a few days after passing through customs. As global internet protocols developed and computer specifications advanced, artistic works like films and dramas that once required months to cross borders are now simultaneously released worldwide through Netflix.

But this acceleration came with hidden costs. The same technologies that enabled unprecedented global connection also created new categories of risk that traditional diplomatic frameworks struggled to address. Nuclear reactors designed with inadequate tsunami protection, ferry systems that prioritized speed over safety protocols, aviation infrastructure that failed to meet international standards—these failures revealed that our

technological interconnectedness had outpaced our institutional wisdom.

Korean readers may be among those who best understand both the promise and the peril of this transformation. While Korea, which was obscure until forty years ago (or remembered with the negative image of being “torn by war”), becoming economically prosperous is already old news, the nation's rise has embodied both the tremendous potential and the tragic vulnerabilities of our hyperconnected age. The most important reason for Korea’s dramatically increased global recognition has been the surge in Korean cultural exports over the past decade. Yet Korea has also experienced firsthand how quickly technological systems can fail catastrophically when safety culture fails to keep pace with rapid development.

2025: A Time of Transition — Considering Speed and Solutions

2025 may be recorded as a fundamental turning point when the optimistic beliefs of the post Cold War era began to completely shatter. The Trump administration’s tariff policies instilled fear that global supply chains—which had always operated robustly in practical terms despite various challenges—could break at any time according to national interests and power logic. As the Ukraine war fell into stalemate, what crumbled was not only Ukraine but also NATO and what seemed like ironclad diplomatic protocols.

In such circumstances, the logic of force is once again dominating global discourse. The psychological borders worldwide that soft power seemed to be dismantling are rising again, and the internet is now fragmenting along national boundaries. Perhaps people have failed to adapt to speeds that became too fast. Many are concerned that technological developments represented by Generative AI, rather than further narrowing cultural distances between people, may now be widening hostility by promoting disinformation.

Yet even as geopolitical tensions rise, the fundamental challenges of our technological age persist. Climate change continues to accelerate regardless of diplomatic relations. Nuclear reactors require international safety coordination whether nations are allies or adversaries. Aviation systems must meet global standards even when cultural bridges burn. These challenges don’t pause for political convenience—they demand solutions that transcend the traditional categories of hard and soft power.

Now that hard power seems to dominate again, what should we focus on in this process? Can we find common ground when traditional diplomatic channels fail and cultural bridges burn? What happens when the very technologies that brought us together—artificial intelligence, global communications, automated systems—become sources of mistrust and division rather than cooperation? And perhaps most urgently: how do we prevent the catastrophic failures that arise when complex technological systems operate across borders without adequate international coordination and oversight?

I believe the answer lies in the integration of technology and diplomacy—what I call: Engineering Diplomacy.

Lessons Written in Catastrophe: When Engineering Meets Humanity

The headlines that have shaped East Asia’s recent history reveal a sobering truth about our technological age. The Sewol Ferry disaster of 2014 (pictured above), the Fukushima nuclear meltdown of 2011, and the Jeju Air crash of 2024 represent more than isolated tragedies—they are symptoms of a fundamental disconnect between our technological

capabilities and our institutional wisdom. Each disaster, in its own way, demonstrates what happens when engineering systems operate without adequate safety culture and diplomatic frameworks to ensure safety across borders and in different countries.

Consider the Sewol Ferry, which capsized in Korean waters carrying 304 souls, most of them high school students. [My two Korean engineering students and I have conducted a systematic root-cause analysis of this tragic accident and published a scholarly article in the *Applied Ergonomics* journal in 2017.] The investigation revealed a cascade of failures that extended far beyond the ship itself: the vessel was carrying 2,142 tons of cargo—1,155 tons over its permitted limit— while carrying only 761 tons of ballast water, far below the 1,703 tons required for safe operation. Inadequate lashing systems allowed cargo to shift during a sharp turn, creating the fatal instability. But the technical failures were compounded by systemic ones: inadequate regulations inherited from Japan, a culture of regulatory capture where inspectors overlooked safety violations, and a company that prioritized profits over passenger safety. The disaster exposed how Korea's rapid industrialization had outpaced its safety culture, creating blind spots in oversight and accountability.

The Fukushima nuclear disaster tells a similar story of speed overwhelming wisdom. When the 9.0 magnitude earthquake struck, it knocked out off-site power, and the subsequent 15-meter tsunami overwhelmed the plant's 10-meter seawall, flooding critical systems. The failure of backup diesel generators left three reactors without cooling, leading to core meltdowns and hydrogen explosions. [I was a member of the National Academy of Sciences and National Research Council Committee "Lessons Learned from the Fukushima Nuclear Accident for Improving Safety and Security of U.S. Nuclear Plants" which inspected Fukushima Daiichi and Diani and published a comprehensive report in 2014.]. But the disaster was not simply a product of natural forces—it was fundamentally institutional, resulting from regulatory capture, inadequate international coordination of safety standards, and a safety culture that prioritized hierarchy over truth-telling. The radioactive cesium-137 and iodine-131 that crossed national boundaries reminded the world that nuclear safety is inherently a diplomatic challenge, not merely a technical one.

Last December, a Boeing 737-800 from Jeju Air, returning from Bangkok, attempted a belly landing after declaring an emergency following a reported bird strike. The aircraft overshot the 2,800-meter runway and collided with a concrete localizer antenna structure at the runway's end—a rigid embankment designed to support navigation equipment but lacking the frangible characteristics that international standards recommend for such installations. The disaster raises urgent questions about airport infrastructure design, the placement of critical navigation equipment, and the adequacy of international aviation safety protocols for emergency landings. [I have been working on and teaching aviation safety at USC for more than three decades and was a member of the FAA Expert Panel to conduct a congressionally-mandated review of Boeing's safety management processes and Boeing's safety culture and testified at a Hearing before the U.S. Senate Committee on Commerce, Science and Transportation about the Panel's findings on April 17, 2024.]

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What unites these tragedies is not just their scale, but their revelation of a fundamental gap: the space between engineering capability and human wisdom, between technological speed and institutional oversight, between national sovereignty and international responsibility. Each disaster occurred because complex technological systems operated without the diplomatic frameworks necessary to ensure safety at the speed of modern life.

Engineering Diplomacy as an Alternative to Power Politics

This is where Engineering Diplomacy becomes not just relevant but essential—and crucially, it offers a pathway beyond the current pessimistic turn toward hard-power politics. In an era when traditional diplomatic channels are failing and cultural bridges are burning, Engineering Diplomacy provides something that both hard and soft power cannot: objective, measurable solutions to objective, measurable problems.

Consider what happens when nations retreat into hard-power logic. Trade wars weaponize supply chains, but the laws of physics don’t recognize tariff barriers—a nuclear meltdown with core temperatures exceeding 2,800°C still threatens neighboring populations regardless of diplomatic relations. Military posturing may project strength, but it cannot prevent a poorly designed aircraft approach system from causing catastrophic impact forces or a ferry from capsizing due to inadequate metacentric height calculations. Hard power may dominate headlines, but it offers no solutions to the technological vulnerabilities that actually threaten people’s daily lives.

Engineering Diplomacy cuts through this geopolitical noise by focusing on shared technical realities. When South Korean investigators work with U.S. aviation authorities to analyze flight data recorders using common protocols for extracting critical parameters like airspeed, altitude, and control surface positions; when Japanese nuclear experts share pressure vessel integrity data and cooling system designs with international colleagues despite political tensions; when ferry stability calculations based on universal principles of naval architecture are harmonized across different regulatory systems—these collaborations succeed precisely because they transcend the zero-sum logic of power politics.

The same technological excellence that made Korea a global powerhouse—from semiconductor fabrication processes to advanced shipbuilding techniques—was built on precise engineering standards. But the Sewol disaster revealed that technological prowess without a safety culture is a hollow achievement. The challenge now is to apply the same systematic precision that built Korea’s economic miracle to building international frameworks that can match the speed of our technological civilization.

This creates what we might call “cooperation of necessity”: a form of international engagement that persists even when other diplomatic channels break down. Even amid rising

tensions between major powers, aviation safety authorities continue to share critical information about bird strike protocols, runway surface friction coefficients, and emergency landing procedures because the alternative is preventable disasters. Nuclear safety experts maintain professional networks to exchange data on coolant flow rates, backup power systems, and seismic design standards because radioactive isotopes don't recognize sovereignty.

This is why Engineering Diplomacy and the humanities must work together—and why this approach offers genuine hope in an age of growing pessimism about international cooperation. Engineering provides the technical precision needed to solve complex problems across borders, while the humanities remind us why those problems matter and for whom we're solving them. In other words, those who are interested in the future of the humanities have to think about Engineering, and vice versa. Together, they offer a path forward that neither retreats into isolationist hard power nor relies on the fading promises of soft power alone.

When I last met with Professor Nye in his office at Harvard Kennedy School (HKS) on April 17, 2025, I told him that I believe his soft power framework and the broader vision of smart power provide the intellectual scaffolding for engineering diplomacy. Both emphasize influence through credibility, collaboration, and narrative, not through coercion or force. Engineering diplomacy is essentially an attempt to operationalize his soft power theory by providing concrete, technical mechanisms for building the relationships and trust that he argues are essential for effective international cooperation. Essentially, we both are advocating for:

- Non-coercive influence through attraction and shared values
- Building sustainable relationships rather than imposing solutions
- Multilateral cooperation on global challenges
- Practical problem-solving that benefits all parties
- Long-term thinking over short-term transactional approaches

When I saw Professor Joe Nye that unforgettable afternoon in April at the HKS, which sadly became our final meeting, I expressed to him for the last time--and I'm certain he knew--I both loved and admired him deeply. I also witnessed something extraordinary: The fire that had ignited his groundbreaking work and book, "*Soft Power: The Means to Success in World Politics,*" still burned brightly in his eyes, undimmed by the passage of decades. That same revolutionary conviction, that unwavering optimism about humanity's potential, pulsed through every word he spoke.

Why did this flame endure so powerfully? Because Professor Nye understood a fundamental truth: While empires rise and fall, while technologies transform our daily existence, the transcendent power of culture remains our most enduring force. It is the invisible thread that weaves nations together, the bridge that spans the deepest divides of ideology and geography.

Now, in our darkest hour, when discord threatens to tear apart the very fabric of international cooperation, when "gunboat diplomacy" is becoming the new normal, we must not merely remember his insights but embody them with fierce determination. The torch he carried has passed to us. We must seize this moment to harness the transformative potential of engineering diplomacy, wielding the soft power of innovation, collaboration, and shared human ingenuity.

Professor Nye's dream lives on, but only if we have the courage to make it our reality. The world is waiting. This *is* our calling; let's answer that call by exercising the soft power of engineering diplomacy.

An edited and abridged version of this essay was first published in Arch*, a South Korean publication that focuses on thematic humanities discourse and public policy issues.*