UNIVERSITY OF CALIFORNIA

Northeast Asia Defense Transparency Index 2021–22

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Summary

Military tensions are on the rise in Northeast Asia as the likes of China, North Korea, and the United States flex their combat capabilities—but this does not mean that war is imminent. This is an important insight from the latest Northeast Asia Defense Transparency Index (DTI) for the period spanning 2021 to 2022. Carried out every two years by the University of California's Institute on Global Conflict and Cooperation, the DTI offers a detailed examination of how open or closed major regional states are in disclosing information on their defense postures, including defense budgets, publication of official annual defense reports, legislative oversight, and the nature of external military activities.

The 2021–22 DTI found that there was only a marginal decline in the overall defense transparency level for Northeast Asia, with Japan showing a noteworthy improvement in its transparency performance. The concealment of defense activities is often an indicator that countries are quietly making preparations for military conflict and contributes to declining trust and confidence. The evidence from this DTI that defense transparency is relatively stable in Northeast Asia is cause for cautious optimism that the long peace that the region has enjoyed remains intact for now. Transparency though is just one indicator of the overall state of defense affairs, and the powerful underlying currents that are the main determinants of war and peace, such as threat perceptions and arms dynamics, all appear to be trending negatively.

IGCC

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NORTHEAST ASIA DTI 2021–22

Key Takeaways

- Defense transparency in 2021–22 showed a negligible decline due to lapses among countries in reporting to the United Nations (UN), but there were encouraging signs of improved openness in other important areas, including legislative oversight and cybersecurity.
- Japan upheld its first-place ranking in 2021–22, while the United States dropped from second to third place and the Republic of Korea (ROK) moved up in rank from third to second place. The U.S. drop was due primarily to its failure to report to the United Nations, while the ROK rise was due primarily to more transparent defense budgets and cybersecurity policy. Japan enjoyed the largest increase in transparency due to improvements in legislative oversight and its ability to sustain UN reporting submissions amid lapses by other countries.
- Despite fluctuations across categories, China, North Korea, and Russia's overall scores remained relatively static compared to 2020–21. China in particular did not publish any new white papers; did not disclose detailed budgets; and did not submit full reports to the UN. Its official website favors propaganda over useful operational content.
- Most countries—especially China, Japan, and Russia—made improvements in legislative oversight. Transparency in cybersecurity also improved overall, driven by large increases in scores from Russia and South Korea. The United States exemplifies transparency in cybersecurity policy and operational details with its nearly perfect cybersecurity transparency score.
- Overall, the defense transparency tiers have remained consistent since 2010: liberal democracies (Japan, ROK, and the United States) are the most transparent group; authoritarian countries, such as Russia and China, demonstrate moderate transparency; and the Democratic People's Republic of Korea (DPRK), despite modest improvements, remains the least transparent country in the region.

Introduction

Military and geostrategic distrust, rivalry, and naked armed aggression among states escalated sharply in 2021–22. Russia's punishing war against Ukraine in 2022 plunged the world back into the dark ages of militarization, spiraling arms races, and the unrelenting threat of nuclear and all-out conventional warfare that the world had seemingly left behind after the Cold War. In Northeast Asia, military tensions also ratcheted up and called into question whether the long peace that the region has enjoyed since the Korean War in the 1950s is coming to an end. North Korea continued to carry out missile tests and announced a new nuclear doctrine that allows for pre-emptive strikes. China's defense modernization and the projection of an increasingly capable long-range military capability continue at a vigorous pace. At the same time, the United States' regional allies remain uncertain about the U.S. commitment to burden-sharing, and tensions in the Taiwan Strait continue to boil.

All of these developments underscore the importance of developments in Northeast Asia for the future of the global security order. Improving security, preventing escalation, and averting war depend on trust and confidence-building between adversaries and competitors. Mistrust and misperception among states are major causes of conflicts and wars. While the anarchical nature of the international system provides permissive conditions for conflict, wars often result from a lack of information or misinformation. States with benign intentions could be perceived as malign actors given incomplete information about armaments, intentions, and military exercises. For instance, a country's rising defense budget due to expansionary fiscal policies could be perceived as a precursor to aggressive foreign policies. This potential for mistakes in the absence of information is why rules such as the Code for Unplanned Encounters at Sea exist—the Code stipulates safe interaction and information-sharing procedures that prevent unintended conflicts between naval forces.

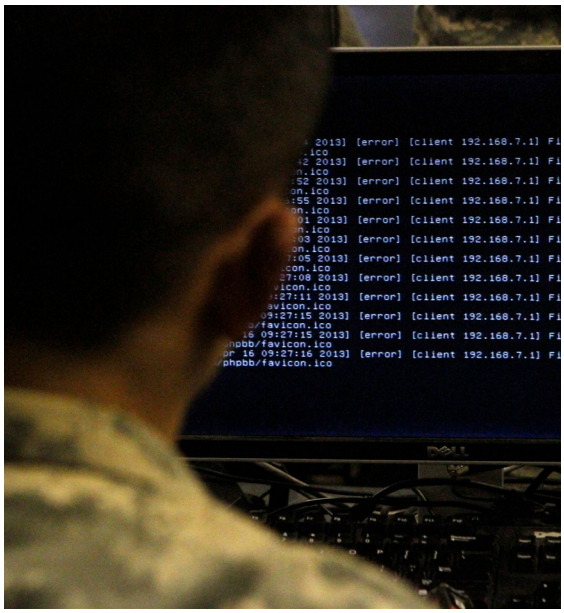


Photo courtesy of West Point.

Improving transparency helps states assess other states' capabilities and moderate the chance of miscalculations. Studies have repeatedly demonstrated that confidence-building measures that improve defense transparency reduce tensions. This is often done by establishing regular disclosures of strategic documents and official statements, in which states elaborate on their understanding of the current security environment. Domestic information such as budgets, legislation, and reporting in the media also help states understand each other's policy intentions and constraints.

In short: "When defense transparency improves, so too do prospects for peace."

The Northeast Asia Defense Transparency Index

Defense transparency and its measurement remain a contested concept. In 2010, the University of California's Institute on Global Conflict and Cooperation (IGCC) created the Northeast Asia Defense Transparency Index (DTI) to address this challenge. The DTI provides a framework that clearly defines and measures different components and factors that quantify defense transparency.

Defense transparency is defined as the ongoing process in which governments credibly transmit timely, relevant, and sufficient information about their military power and activities, budgetary matters, and intentions to allow other states and domestic audiences to assess the consistency of this information with declared strategic interests and institutional obligations to reduce misperception, ensure good governance, and build mutual trust.

The index assesses three domains: (1) information-sharing processes, (2) domestic institutions and hierarchies, and (3) signals and intentions. Each of these represents states' capacity to convey information, as well as other states' ability to understand strategy and intentions. Based on these three facets, the DTI tracks progress across eight indicators to measure a country's defense transparency:

1. Disclosures in defense white papers
2. Information available on official defense websites
3. Reporting to the United Nations
4. Openness of defense budgets
5. Robustness of legislative oversight
6. Robustness of media independence and reporting
7. Disclosures of international military activity
8. Disclosures of cybersecurity activities

2021–22 DTI Results

The 2021–22 DTI shows a minor decrease in overall transparency among the six countries covered in the survey: China, the DPRK, Japan, the Republic of Korea (ROK), the United States, and Russia (Table 1). Except for Japan's clear improvement and leading position, every other country's DTI score has either remained static or slightly declined since 2020. However, there were encouraging signs of improvement in key areas, and the overall decline in scores was driven primarily by country performance on one indicator—reporting to the UN—which tends to fluctuate anyway. Moreover, the fluctuation in overall scores is part of a longer trend: for example, while the 2018–19 DTI update showed a significant decrease in overall transparency, scores increased overall in the 2020–21 Index.

Country rankings changed in 2021–22. Japan upheld its first-place ranking, while the United States dropped from second to third place and the ROK moved up in rank from third to second place. The U.S. drop was due primarily to its failure to report to the United Nations, while the ROK rise was due primarily to more transparent defense budgets and cybersecurity policy. Japan enjoyed the largest increase in transparency due to improvements in legislative oversight and its ability to sustain UN reporting submissions.

Little change was seen in two of the areas controlled by formal legal institutions—budget transparency and media independence—but big strides were made in legislative oversight. While Japan's National Diet produced more reports on defense issues, China implemented new regulations to monitor the budgetary process. South Korea held more public hearings and Russia enhanced its supervision of defense corporations and legislative collaboration with the executive branch.

The liberal democracies disclosed more information about their international activities, missions, and arms transfers than in 2020–21. And in cybersecurity, all countries released more information about their policy goals, regulations, and threat assessments than they did in the last cycle. The United States in particular published a comprehensive document to describe its cybersecurity command structure and related agencies.

Most states provided less information in their defense white papers and on their defense ministry websites, and shared less information about their defense budgets in 2021–22, with some variation.

Reporting to the United Nations decreased precipitously this year. Except for Japan, no countries submitted full information about their arms transfers and holdings to the United Nations. In particular, both the United States and North Korea failed to submit any report to the United Nations.

TABLE 1

Country performance by indicator, 2020–21 versus 2021–22

Variables	DPRK	Japan	PRC	ROK	Russia	USA
Overall score	↔	↑	↓	↓	↔	↓
Defense white papers	↔	↓	↓	↓	↔	↓
Defense websites	↔	↓	↓	↓	↓	↔
Legislative oversight	↔	↑	↑	↑	↑	↔
Defense budgets	↔	↓	↔	↑	↓	↓
Media independence and reporting	↑	↑	↔	↑	↑	↔
Reporting to the UN	↔	↔	↔	↓	↓	↓
International military activity	↔	↑	↔	↔	↑	↑
Cybersecurity activity	↔	↑	↑	↑	↑	↑

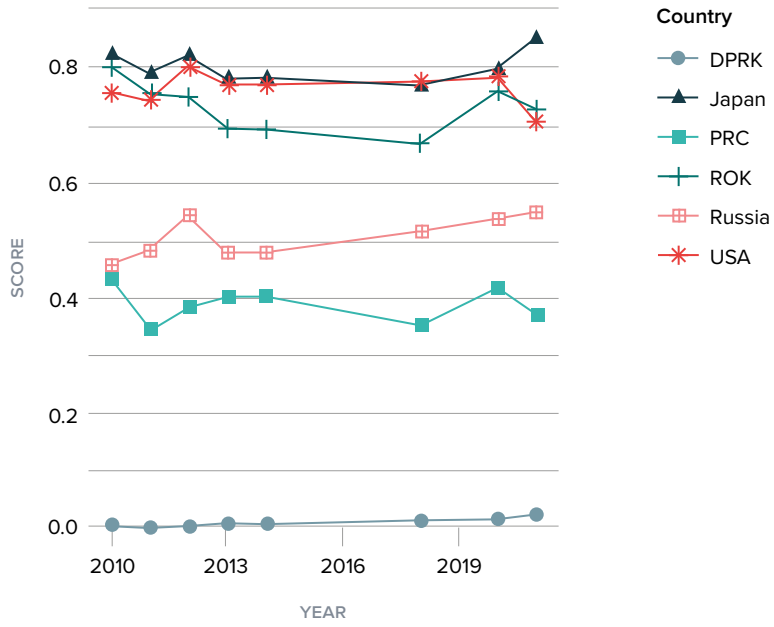
TABLE 2

Country Scores and Rank, 2021–22 versus 2020–21

	2021–22 Total	2020–21 Total	2021–22 Rank	2020–21 Rank	Change in Rank
Japan	0.843	0.798	1	1	↔
ROK	0.729	0.761	2	3	↑
United States	0.708	0.785	3	2	↓
Russia	0.550	0.538	4	4	↔
PRC	0.370	0.397	5	5	↔
DPRK	0.020	0.014	6	6	↔
Overall Score	0.537	0.549			

FIGURE 1

Overall trends: 2010-2021



White Papers

Defense white papers—documents that describe the strategic environment and military strategy—are a major channel through which states convey their intentions and strategy. The 2021–22 DTI shows an overall modest decline in transparency in this category among countries.

The U.S. score continued to rebound following its decline in 2018–19 due to the U.S. decision to halt the publication of the quadrennial defense review. U.S. President Joe Biden was expected to publish a National Defense Strategy within the first year of his presidency, however, the strategy was only released in October 2022. Nonetheless, the U.S. score improved in 2021–22 due to the publication of a detailed *Interim National Security Strategic Guidance* and the *2022 Indo-Pacific Strategy of the United States*. These white papers addressed areas germane to the Northeast Asia Defense Transparency Index, such as strategy and doctrine, defense management and resources, and access and oversight.

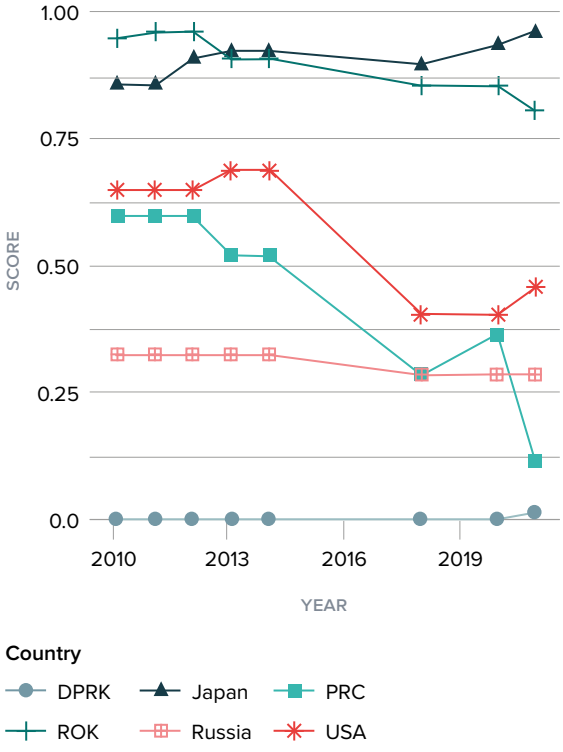
Japan and South Korea, both routinely among the top performers in this category, showed slight declines in 2021–22. For both countries, declines are attributable to recent content omissions, such as classification of armaments across service branches and discussion of the citizens' views on war. Despite the slight decline, both countries maintained their consistent first and second spots for the most defense white paper transparency.

Another notable trend was China's significant drop in transparency due to the lack of defense white paper equivalency this year. The last time China published a defense white paper was in 2019; prior to that, China had not published a general strategic white paper since 2015. Although Beijing issued an abundance of high-level announcements and reports, such as the 14th Five-Year Plan, which elaborates high-level goals for the country as a whole on a range of issues, from the economy to education and the environment, and the Report on the Work of the Government, they have very limited coverage of defense issues. Even the white paper on *The Taiwan Question and China's Reunification in a New Era*, which was published in 2022, lacks sufficient detail to improve China's transparency score in this category, although it does send a strong strategic message.

Russia, which publishes white papers sporadically, saw its score stagnate in 2021–22. Russia published the Decree of the President of the Russian Federation No. 400 "On the National Security Strategy of the Russian Federation," which elaborates on the threat environment but lacks information about readiness numbers, location of troops, and weapons procurement. Finally, North Korea upheld its historical omission of defense white paper publication. However, it did publish a law to clarify command, control, and doctrine with regards to the use of nuclear weapons.

FIGURE 2

Defense white papers



BOX 1

Implications of New U.S. and Japanese National Security Strategies

In late 2022, after the DTI was already completed, the United States published its National Security Strategy (NSS) and National Defense Strategy (NDS), while Japan published its National Security Strategy and annual defense white paper. In these documents, both states emphasize the challenges of China and Russia and disclose more information on the development of advanced technology, however, despite the release of new information, their publication would not have made a significant impact on either country's DTI score.

The newly released U.S. documents reveal little about current or projected defense spending but do provide a window into how the U.S. government is thinking about security threats. The NSS makes clear that the United States' most pressing global priority is addressing threats posed by China and Russia. This concern is echoed in the NDS, which highlights various methods of deterrence and enhancing capabilities. The NSS also reveals overall budget priorities, such as investment in infrastructure and key technologies, as well as in non-traditional security areas like climate change and COVID-19.

Japan, as always, is transparent about its threat assessments, military capabilities, budgets, and strategies. Meanwhile, as the importance of critical technologies increases, these newly published documents show that Japan is placing considerable emphasis on the development of advanced defense production and technology. Both the NSS and its defense white paper mention the use of technology transfers as a form of deterrence and security cooperation. Overall, the newly published strategies serve to maintain Japan's superior defense transparency score, and reveal its growing attention to defense capabilities and technology.

Defense Ministry Websites

Among the eight indicators measured in the Index, countries scored highest for the transparency of their defense ministry websites. The United States and Japan maintained their first and second rankings, respectively. Both countries continue to improve upon already robust defense ministry websites, which provide information across 11 subcategories including:

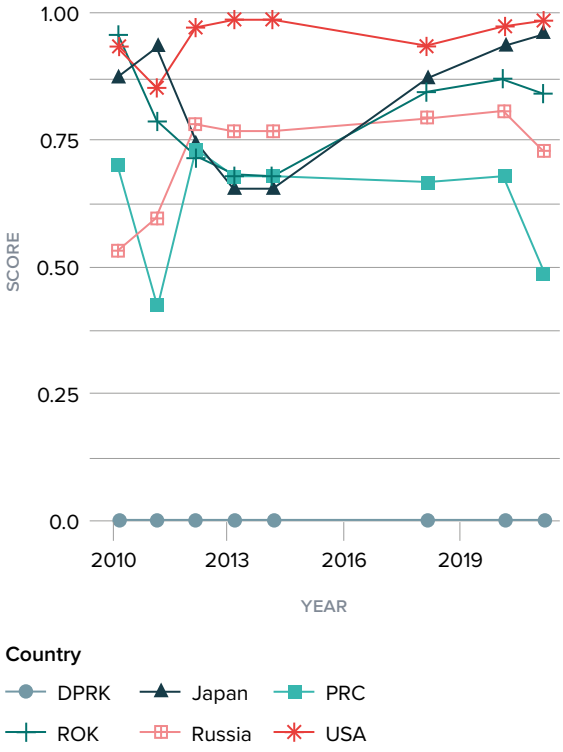
- Defense policy
- News
- Arms and development
- Defense ministry activities and structure
- Personnel
- Force structure
- Military activities
- Nuclear security
- Laws governing the defense ministry
- International peacekeeping operations and humanitarian missions
- Defense ministry website engagement features, such as requests for information or complaint channels

This year, the United States published the quantity of arms equipment in service, improving its already high score. Similarly, Japan published its nuclear deterrence and property policy, intelligence-gathering activities, and information about defense ministry travel, meetings, and foreign visitors, boosting its score. Japan's website previously made most data only available in Japanese, but during 2021–22, the Japan Ministry of Defense website expanded the amount and quality of content available in English, thus making the website more useful to external audiences, and improving the overall look and feel, making the website easier to navigate. South Korea, which scores third, continues to publish content primarily in the native language, reducing its utility for international audiences.

China publishes an abundance of content on its website, but most of it is propaganda and non-operational information. In an additional barrier to extracting meaningful defense details, China publishes a significant amount of its content in Chinese only. Russia, which has improved greatly in this area since the DTI began in 2010, reduced the amount and quality of information shared as compared to 2020–21. In 2021–22, China and Russia both stopped publishing information on information technology, personnel recruitment details, including salary, and crisis management.

FIGURE 3

Defense websites



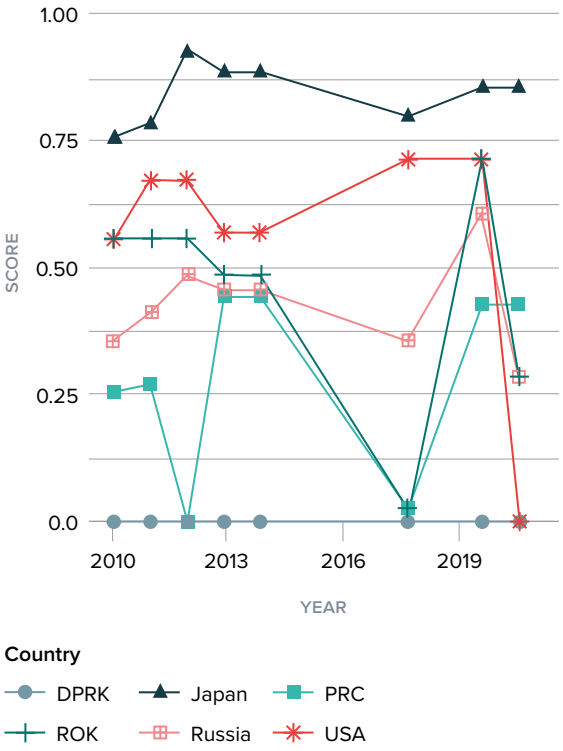
Reporting to the United Nations

Submissions to the United Nations continued to fluctuate substantially in 2021–22. These fluctuations are a result of periodic submissions to, or lapses thereof, four UN reporting measures over four areas: Military Expenditures, the United Nations Register of Conventional Arms (UNROCA), Arms Transfer, and Military Confidence Building. When aggregated across the six DTI countries, reporting to the United Nations is the weakest area of defense transparency for 2021–22, due to most nations' failure to report. This follows a significant increase in transparency in this domain in the previous DTI in 2020–21.

Japan, which was recently awarded a non-permanent seat on the Security Council for 2023 and 2024, was the positive outlier. Japan secured the highest score among DTI countries by disclosing information on both military expenditures and conventional arms. The United States and North Korea did not submit any information to the UN. North Korea has never submitted reports, but this was the first year since the DTI started tracking data in 2010 that the United States abstained from filing any UN reports. Although there is no documented reason for this reporting gap, it does correlate with a year of major events that consumed defense ministry bandwidth, such as the Russia-Ukraine war, the ongoing pandemic, and numerous leadership changes, including an incoming U.S. Secretary of Defense and Commander in Chief. China, Russia, and South Korea's scores reflect only partial report submissions to the Register of Conventional Arms. None of the six countries submitted information on military expenditures, arms export regulations, or confidence-building measures. As a result, the overall DTI score fell in 2021–22.

FIGURE 4

Reporting to United Nations



Budget Transparency

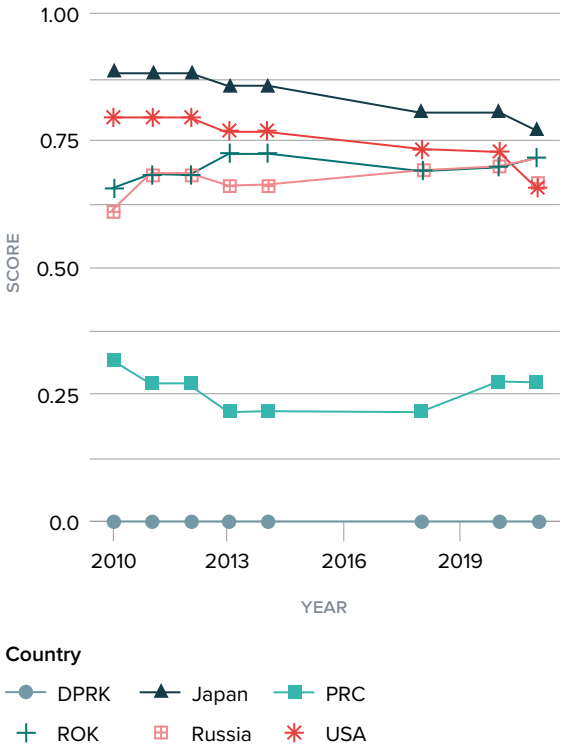
In stark contrast to UN submissions, budget transparency is mostly static despite slight decreases in all countries except North Korea (which remained stable with a nil score) and South Korea (whose score increased slightly). Budget processes and institutions tend not to change dramatically over time, so it is perhaps no surprise that countries' scores on this indicator are fairly stable.

Japan, South Korea, Russia, and the United States are clustered together with similarly high budget transparency scores. South Korea is the only country whose budget transparency has increased since 2020–21. This slight increase is attributed to a public pre-budget statement that describes government policy and priorities and a public mid-year review that discusses changes in the economic outlook and updated expenditure estimates for the budget year underway.
The United States experienced the greatest relative decrease in budget transparency, although the overall drop was very slight and due to a U.S. decision to stop publishing a public mid-year review of the budget.

China ranks fifth, only ahead of the DPRK. In this year's military expenditure declarations, Beijing replaced actual numbers with estimates. China's budget also has a higher percentage of secret items compared to other countries.

FIGURE 5

Defense budgets



Legislative Oversight

Legislative oversight measures each country's legislative power to monitor and participate in creating defense budgets. Like budget transparency, legislative oversight is driven by formal government institutions and tends not to change much year-to-year. In fact, the ranking of countries has never changed for this indicator since the DTI began in 2010. However, this year, two countries demonstrated improvement in their legislative branches' powers to oversee defense budgets.

Japan, Russia, and China had major transparency increases due to new regulations, public hearings, and the release of reports. Japan's score benefited from increasing reports from the National Diet on defense issues as well as more bargaining on defense issues among political parties following Prime Minister Shinzo Abe's retirement.

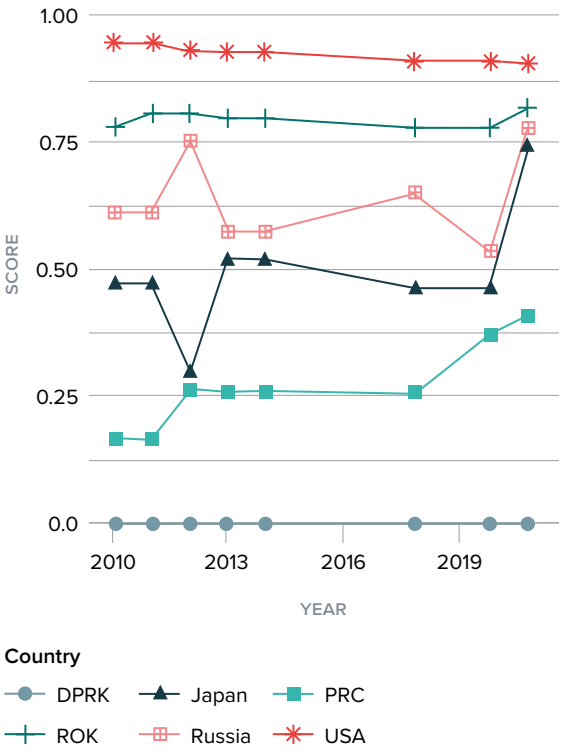
In 2020, China introduced the Regulation for the Implementation of the Budget Law, which modestly boosted its score. However, China's institutions do not allow for public participation in the budget process, legislative power to amend the budget, and inter-party negotiation on defense issues. Russia improved legislative supervision of various types of defense corporations. Laws that stipulate shared authority between the executive and legislative branches to formulate budgets also enhanced the country's legislative oversight score. It should be noted, however, that not all legislative oversight is the same. Executive-legislative relations vary substantially across countries. China and Russia's improvement in legislative oversight could indicate increasing executive power consolidation.

The United States and South Korea hold the top positions. The U.S. score dipped slightly because of a lack of mid-year reviews and public testimony in hearings. Still, the United States' well-established legislative branches are well-equipped to examine defense programs and budgets. South Korea's improvement stems mostly from regular public hearings held by legislative committees.

North Korea's legislative oversight remains absent.

FIGURE 6

Legislative oversight



Media Oversight

Media independence and oversight is another of the most stable areas among DTI variables. When coding media oversight, the DTI counts both governmental media, such as defense media and their social media accounts, and independent media. Liberal democracies score higher than non-liberal countries, since media oversight of the military depends heavily on freedom of the press to conduct independent reporting.

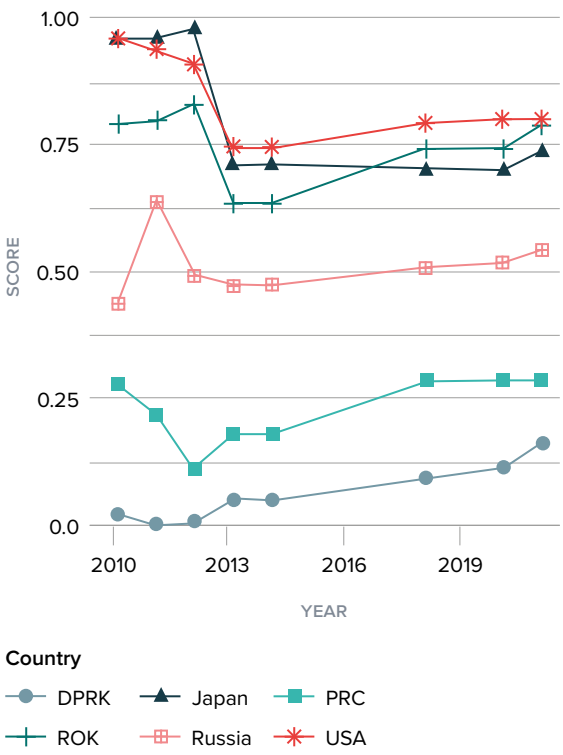
Japan, South Korea, and the United States are home to a wide array of independent media, including news websites, academic journals, mainstream media, and social media. Media outlets in liberal democracies do not function as the mouthpiece of their respective governments, but rather maintain substantial independence in their reporting. Some of them even allow for the publishing of stories that contravene secrecy laws.

In contrast, Chinese and Russian media are closely aligned with their respective governments and do not enjoy the freedom of the press legal protections granted to the media in democracies. Without laws protecting the independence of defense media, both countries score poorly on media oversight.

Finally, North Korea's incremental improvement is noticeable. The source of this increase is the growing volume of mainstream defense reporting and propaganda, which highlights the progress of North Korea's military buildup. This also reflects Chairman Kim Jong-un's influence on defense matters. While the quality of the information requires further examination, North Korea's mainstream media and propaganda remain an important channel to understand North Korea's military development.

FIGURE 7

Media oversight



Publication of International Activities

Country transparency about international activities—which includes information about the number of personnel deployed on international missions, security cooperation with other countries, and arms transfers—generally remained static or improved in 2021–22.

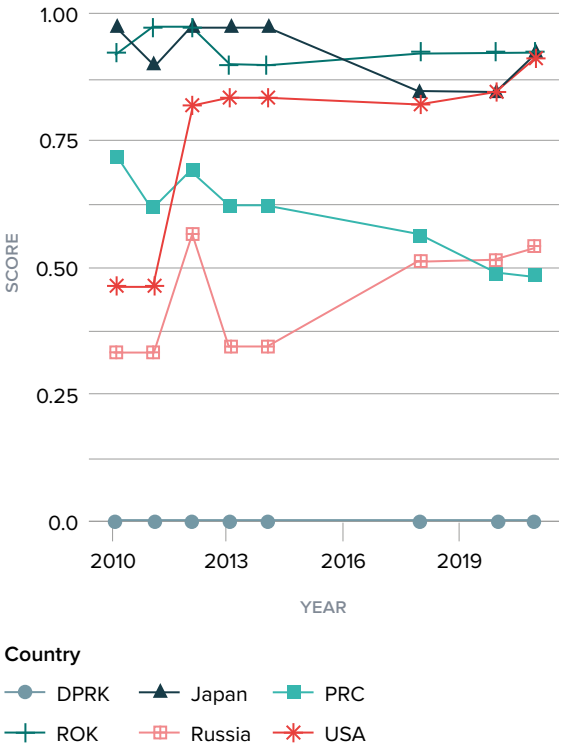
Top-ranked Japan actively shared information about defense cooperation with its growing portfolio of allied and security partners. The United States also disclosed considerable details about its military missions and operations, including the types and number of personnel, equipment, capabilities, and the specific roles the armed forces played in those missions.

South Korea's growing role as an arms exporter was clarified in the recently published Military 2.0 Reform, which restructured the South Korean military by prioritizing a comprehensive response to security threats, implementing the latest technology, and developing a military culture to tackle human rights issues. The Military 2.0 Reform highlighted increases in the sale of weapons to foreign countries, as well as weapons imports, and set transparency in the defense acquisition programs as a target of the reform.

China released substantial information about its participation in international exercises, including its participation in UN peacekeeping operations and its contribution to anti-terrorism operations under the Shanghai Cooperation Organization. However, Beijing withheld operational information such as personnel-related details and arms sales.

FIGURE 8

International military activity



Russia's publication on international activities reflects its tensions with Ukraine and the West. At the end of 2021, the Russian Ministry of Foreign Affairs published two drafts of the U.S.-Russia and NATO-Russia agreements that encapsulate Moscow's desired security guarantees. Moscow also announced its purchase of missiles from North Korea. However, key information, such as the location of military exercises and overall plans regarding arms transfers, is missing. North Korea did not publish any information about its international activities.

Cybersecurity

Cyberspace policy remains one of the most transparent and improved areas in the DTI. All countries have become more transparent within the past decade, as states increasingly regard cyberspace as an emerging domain for security and warfare. The most transparent countries share cyber-related content in their defense strategies and other publicly available documents.

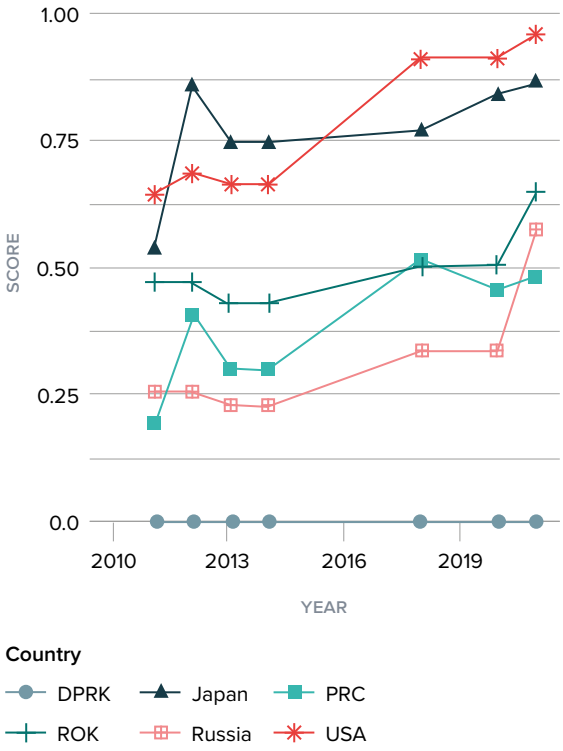
The United States, for example, published a Cybersecurity Resource and Reference Guide in 2022, which lays out a roadmap and details that link multiple Department of Defense agencies, industry, and international policies on cybersecurity. Japan's white paper similarly covers cybersecurity. The term "cyber" appears hundreds of times in the paper and is addressed in multiple ways, especially in the sections that outline in detail the threats Japan faces. However, the sections on how the government is countering those threats are less developed, putting Japan in second place.

Unlike in the United States and Japan, South Korea lacks a centralized institution responsible for cybersecurity policy; rather, responsibility for cyber is spread among a decentralized governance apparatus and the private sector, making coherence and transparency more difficult to achieve.

Although China considers cyber a key area in its techno-security development, Beijing has not issued any white paper or official documents about cybersecurity or the People's Liberation Army Strategy Support Force, which is in charge of China's cyber-related operations. While China did disclose some information that met the requirement of DTI, non-operational information

FIGURE 9

Cybersecurity



still dominates China's web pages and related public statements. Russia's Cyber Security Strategy is relatively clear about its assessment of the cybersecurity environment, organizations, and capabilities, but it lacks information about the details of Russia's operations and plans. North Korea has not made any public statements on cybersecurity matters.

Photo courtesy of U.S. Army.

Conclusion and Implications

The 2021–22 Defense Transparency Index demonstrated a negligible decline in transparency among ranked countries due to UN reporting issues, despite positive signs of improved openness in some areas, including legislative oversight and cybersecurity. Japan upheld its first place, while the ROK replaced the United States by moving up in rank from third to second place. China, North Korea, and Russia's overall scores remained relatively static compared to 2020–21. In terms of policy areas, there was substantial growth in transparency in cybersecurity policy and legislative oversight, in which most countries made improvements. Overall, the defense transparency tiers have remained consistent in the last decade: Japan, ROK, and the United States are the most transparent while Russia and China show moderate transparency. Finally, DPRK remains the least transparent country in the region.

The DTI also identified conditions outside the defense domain that nonetheless have positive spillover effects for defense transparency. Public access to technology in particular may improve the ability of states to understand the activities and intentions of other states. Examples include private companies and think tanks that use satellite images to reveal military build-ups and warfighters who use social media on the battlefield to deliver first-hand observations.

As the 2022 war in Ukraine sets a precedent for hybrid warfare across diplomatic, economic, informational, and military spectrums, defense transparency is a critical tool to mitigate escalation. It is through defense transparency that clearer understandings of strategy, capability, and intentions are gained, and that understanding has great potential to reduce unnecessary suffering.

BOX 2

Methodology

IGCC's Defense Transparency Index includes sub-scores for transparency indicators in eight areas: disclosures in defense white papers; information available on official defense websites; reporting to the United Nations; openness of defense budgets; the robustness of legislative oversight; the robustness of media independence and reporting; disclosures of international military activity; and disclosures related to cybersecurity activities. This year, IGCC hired several native speakers from each country to enhance the comprehensiveness of the data collection process. The coding process goes as follows.

- Scores for white papers are based on the depth and breadth of information contained in the most recent strategy document(s) released by the countries. We also score the information on respective countries' websites—with attention to both the English and native language versions of the websites.
- UN reporting is scored for completeness and timeliness.
- Budgetary transparency scores are based on third-party databases from the Open Budget Survey (OBP), Stockholm International Peace Research Institute (SIPRI), and International Institute for Strategic Studies (IISS), as well as publicly available information regarding the financial resources devoted to the countries' militaries, with a focus on the particularity and specificity of the accounting entries.
- Legislative oversight is judged by nongovernmental organization (NGO) reports, official government publications, academic writings, and media reports.
- Media oversight is judged by the level of press freedom found in the country, primarily as reported by Reporters Without Borders (RSF).
- The transparency of international activities is judged by the publicly available information about such activities by states in white papers, on their websites, in press briefings, and in press releases.
- Lastly, cybersecurity activity is based both on officially published cyber strategies and on pertinent content found in the white papers and websites of each country. Overall transparency scores are based on the equal weighting of all eight subindices. Scores with different weightings of subindices can be accessed in the dataset.

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