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As part of its research agenda, IPCS reviews significant academic contributions like books, reports and articles. The researchers are encouraged to critically review and respond to academic and research interventions at the regional and international levels. In the past, the researchers at the Institute have reviewed the reports of Transparency International, International Crisis Group and other academic institutions.

The researchers at the Nuclear Security Programme (NSP) have undertaken a peer review of the Nuclear Threat Initiative's (NTI) Nuclear Materials Security Index which was published in January 2012. The NSP at the IPCS seeks to respond to the twin challenges of nuclear disarmament and non-proliferation through the provision of independent, objective assessments, and by supplementing existing policy debates and strategic analyses. The NSP's work manifests in research projects, track-II dialogues, capacity-building for young scholars, and conferences, seminars and panel discussions to nurture the evolution of an informed strategic community.

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The views expressed are authors' own.

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NTI Nuclear Materials Security Index

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On 11 January 2012, the Washington-based Nuclear Threat Initiative (NTI) released a Nuclear Materials Security Index, prepared in collaboration with the Economist Intelligence Unit (EIU). This public benchmarking project was undertaken in 2011 and its release occurred just ahead of the Nuclear Security Summit (NSS) in Seoul in March 2012. The Index added to the sense of urgency projected by the NSS to secure nuclear materials around the world, and at the same time, ignited debate and controversy with respect to its methodology, findings and rankings. In this review, the IPCS, while acknowledging that the construction of the Index is focused on global nuclear disarmament, attempts to assess it without ideological moorings. In doing so, it critically analyzes the variables and methodology adopted by the NTI in tandem with the Index's objectives and findings.

I
THE NTI INDEX: UNIVERSALIZED OBJECTIVES AND OBJECTIVE CONCLUSIONS

The NTI Nuclear Materials Security Index is contained in a 124-page report describing the aims and objectives of the project, its process and components, findings and recommendations.

Aims and objectives

In his foreword, NTI Co-Chairman and CEO Sam Nunn writes that nuclear security is concerned with the prevention of nuclear terrorism. In this age of extensive proliferation of nuclear technological know-how, the threat of nuclear weapons use, however rudimentary, by terrorists, criminals and 'rogue' states is enormous.

The existence of large and increasing stocks of unsecured nuclear materials around the world and the absence of standard mechanisms to protect national stockpiles is a serious danger. The report notes that 'there is no agreed global baseline defining what minimum security and control measures should be put in place at sites with Highly Enriched Uranium (HEU) and plutonium' and that the role of the International Atomic Energy Agency (IAEA) in ensuring nuclear materials security is 'limited by both, mandate and budget'. The Index aims to define the essential elements of nuclear security and provide a framework to establish common tools and practices for nuclear materials security. It aims to generate international discussion on the issue and persuade governments to provide assurances and undertake actions towards risk-reduction.

The NTI project is closely knit with the NSS initiative. Nunn is an informal advisor to President Obama; the latter having successfully focused the attention of world leaders on nuclear security. Both initiatives identify nuclear security primarily in the context of nuclear terrorism. The Index intends to place before governments, facts and figures to substantiate the project's arguments and research. The statistics and rankings are meant to provide comprehensive common standards for nuclear materials security.

Process and components

The project was undertaken in 2011 (March to October, according to the report), the year between the Washington and Seoul Nuclear Security Summits. The NTI collaborated with the

business information wing of The Economist Group, the Economist Intelligence Unit (EIU), for the construction of the Index.

The Nuclear Materials Security Index has been described by the NTI as a 'public baseline assessment of the status of nuclear materials security conditions around the world'. Nuclear materials security in 176 countries was assessed on the basis of certain indicators. Here, a distinction is not made between countries with and without weapons-usable nuclear material when it comes to vulnerabilities, because those without such material can be safe havens for terrorists; but not all indicators are applicable to the two groups. 32 countries with more than 1 kg weapons usable nuclear material (called countries with materials) were assessed on 18 indicators (51 sub-indicators) that fell into 5 main categories – Quantities (of material) and (number of) Sites, Security (physical, personnel and transport) and Control (inventory and accounting) Measures, Global Norms (voluntary and legal commitments), Domestic Commitments and Capacities (implementation and actions) and Societal Factors (corruption, political stability). 144 countries with less than 1 kg/no weapons-usable nuclear material were assessed only in the last three categories.

Experts convened by the NTI defined the framework for nuclear security and the EIU team collected the data and formulated the methodology. An International Panel of 13 experts from 11 countries and 2 institutions (IAEA and World institute of Nuclear Security or WINS) were assembled for the purpose of assigning weights to the categories and indicators that were developed. Governments of the 32 countries with materials were requested to review the information (17 countries undertook the review) for confirmation and validation. Countries were awarded scores out of 100 in each category and the weighted average of the scores was used to award the overall score (again, out of 100). Indicators had differentiated weights, for instance the quantities of materials, response capabilities, transparency, safeguards adoption and compliance, and political stability were some indicators with higher weightage.

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The scope of the methodology is narrow. Given the secrecy involved in nuclear materials-related information in most countries, the Index had to rely on open-to-public sources of data like white paper publications, institutional and expert reports. The EIU reviewed countries' legal and regulatory systems wherever possible and used proxy estimates in other cases (Iran, Israel, North Korea and Pakistan). Official interviews and reviews were used for validation and confirmation. The Index confesses that the indicators make a qualitative (and not quantitative) analysis of nuclear materials security. As for the framework itself, the Index measures weapons-usable nuclear material (HEU, separated plutonium and plutonium in mixed oxide fuel) which does not include low enriched uranium or radiological materials which can be used to fashion a dirty bomb.

Findings and recommendations

Based on the measurement of countries' policies, actions, commitments and societal conditions, the report makes ten key observations. It observes that more governments are now engaged in combating the threat posed by unsecured nuclear material, thanks to a growing awareness created by international efforts like the NSS. That the absence of a global consensus on an international system of regulating the production and use of nuclear material is missing may be attributable to the 'deliberate lack of transparency by countries and the absence of published information and peer reviews'. Australia ranks first amongst countries with nuclear materials (score of 94 on 100); it scores above average on most indicators. The United Kingdom leads the nuclear weapons-armed

countries in terms of security and control measures as well as international obligations. The report warns of increasing global stockpiles of nuclear weapons usable material and worsening societal conditions in many countries.

Finally, it is hoped that more countries will adhere to international agreements and work towards eliminating nuclear materials altogether. The Index provides recommendations to build a framework of 3 'A's – assurance, accountability and action. Since countries have both an individual and a collective responsibility towards nuclear security, they can be encouraged to build a global system of nuclear security through dialogues, greater accountability, stronger control measures, benchmarks, transparency practices and adherence to international treaties. At the same time, countries must work towards reducing and ultimately eliminating these stockpiles. The report proposes bringing all civilian uranium enrichment and reprocessing facilities under IAEA safeguards. It also encourages the US, Russia and IAEA to offer nuclear security assistance to other countries.

II
THE INDEX: VARIABLES AND VARIATONS

The NTI Index, through its objectives, processes, and recommendations, has attempted to evaluate countries against a standardized benchmark to reach conclusions that are not governed by particularities of any country. Appreciating that standardized tests require an even application of norms to all parties, and accepting the NTI's argument that several mitigating mechanisms were built into the Index that corrected individual aberrations, this section will critically examine the chosen methodology and the various variables examined in the Index.

The Index asks countries to declare all stocks of fissile material including those of HEU and plutonium. However this may severely compromise their deterrence and doctrines based on minimality. This requirement of the Index, in all probability, will lead to diffidence in the nuclear 'have nots'.

Transparency

Transparency, starting with the definition of this term used by the NTI, poses problems. While the social and administrative dynamics of information-sharing are well known, several of the countries ranked low on the list (India, Pakistan, North Korea, for example) base their deterrence precisely on the lack of such transparency. In fact a convincing case can be made by these three countries that transparency would in fact seriously dent not just deterrence but also the security of their respective programmes.

For example, greater the transparency in Pakistan's programme, greater the chances of its security being compromised, given the levels of radicalization within Pakistan's security structures. There is also a case to be made here that the very impression of a lack of security mechanisms in itself can be a powerful bargaining tool to extract geopolitical concessions; essentially nuclear blackmail. India subjecting its security to peer review possibly even by some Pakistanis working for the IAEA opens up the possibility of such intelligence being used to plan a sub-state strike on Indian reactors to circumvent the existent mutual non-attack guarantees operative at the state level. All these are real concerns given Pakistan's systemic preference for using proxy actors. Some methodology will have to be found to deal with these dilemmas.

Similarly, the Index asks countries to declare all stocks of fissile material including those of HEU and plutonium. However this may severely compromise their deterrence and doctrines based on minimality. This requirement of the Index, in all probability, will lead to diffidence in the nuclear 'have nots'. While this modality to declare stocks is understandable from the NTI's perspective on universal nuclear disarmament, it disadvantages some countries while condoning

others, and may not encourage the hold outs or the P5 to work towards complete elimination.

The emphasis on transparency is well taken, but it must also be recognized that that transparency can in most cases create significant equities. In the IPCS interaction with the NTI it was suggested that El Baradei's statement quoted on the first page of the Index (to the effect that recovered material when traced back was not reported as missing, while stocks reported as missing were seldom found) if set into a database would provide concrete and tangible empirical evidence of the relationship between transparency and security. It remains to be seen if this can be incorporated into another Index/ Study. The need for corroborative statistics is critical to force nuclear bureaucracies to act, as in their absence, most criticisms of opacity can be dismissed.

As a result, while the goal of transparency that the NTI Index strives for is both desirable and required; its impracticality leaves the methodology open to debate. Often, instead of providing ammunition to those seeking more accountability from nuclear bureaucracies, it plays into the hands of the same nuclear bureaucracies to ensure that the exact reverse is achieved.

The Index states that individual governments were approached before it was published to examine the veracity of the categories and indicators, and raise objections. India did not respond to this overture, and dismissed the Index later as propaganda by 'non-proliferation activists'.

This analysis reveals that India had legitimate grounds for debating sections of the methodology, but it chose not to do so. While silence can very often be interpreted as consent, in this case, it reveals the psychological conditioning of the Indian bureaucracy, due to long years of technology denial. It seems India treats any comment on its nuclear assets with extreme suspicion, which does not seem unjustified given its long history of being a nuclear pariah that may have led to a certain victim mentality.

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Form over function

Another criticism of the report emerges over how the report tends to accept form over function. For example, Pakistan's scores a perfect hundred for having an independent regulatory body as opposed to India scoring a zero for its lack of one. This begs the question whether countries like Pakistan, where the army wields control over all aspects of security and foreign policy can ever have an 'independent' nuclear regulatory authority.

Similarly, while India is moving towards an independent regulatory authority, as envisaged in the Nuclear Security Regulatory Authority (NSRA) bill, much of its independence has been progressively whittled away. The bill for its institutionalization seeks to make amendments to the Right to Information (RTI) Act, and one of the proposals asks for the exemption of bodies created to regulate nuclear security from the ambit of the RTI. This undermines the right of people's access to information in a democracy and moves towards a more transparent nuclear security culture.

While it is acknowledged that the linkage between nuclear security and transparency has its limits, some efforts towards inspiring both domestic and international confidence in a country's security arrangements must nonetheless be made. The NSRA's staffing will also be from within the limited domain knowledge that exists within India and

essentially restricted to retired 'insiders'. Hence even in India's case, its score will surely improve when the NSRA comes into being, but the 'independence' of its regulation will be suspect.
Here of course the NTI faces an unenviable dilemma – how to introduce value judgements on the actual degree of 'independence', which fundamentally introduces a level of arbitrariness to what should be a standardized measure. Yet the lack of such arbitrariness opens up the report to criticism. At some point, some criteria will have to be introduced to measure the actual autonomy of ostensibly 'independent' regulatory bodies.

Similar criticisms can also be levelled against the transparency function delineated in the methodology because the P5 can switch the designation of 'military' and 'civilian' reactors at will, and in doing so can fudge statistics. Nuclear holdouts like Israel, India, Pakistan or North Korea will not be able to do this. Corruption is included as a societal factor, but it need not necessarily be held inversely proportionate to transparency. Logic can dictate that greater the level of corruption, greater the need for secrecy surrounding security measures to shield such security from being compromised.

Serious objections will also have to be raised about internal security indicators. For example, the level of personal firearms possession in the US, the existence of militias, and their demonstrated ability to carry out more sophisticated strikes (like the Omaha bombings) than many South Asian terror groups is not given proper weightage. Indeed one could argue that the level of militarization of Russian society given compulsory military service and high rates of unemployment may pose a similar level of threat. In ignoring such internal factors the NTI seems to have adopted a culturally-specific and hence arbitrary notion of internal societal factors that will not be acceptable universally.

At a fundamental level, the methodology can be summarized as the 'twin versus quad engine' debate that occurred in the airline industry, as fewer engines meant fewer chances of failure. In nuclear terms, this translates into the bigger the stockpile the greater the statistical chances of things going wrong.

General Issues

At a fundamental level, the methodology can be summarized as the 'twin versus quad engine' debate that occurred in the airline industry, as fewer engines meant fewer chances of failure. In nuclear terms, this translates into the bigger the stockpile the greater the statistical chances of things going wrong. As a result, the scoring starts off as a negative sum correlated to the size of the stockpile with positive scoring for every criterion met. While statistically sound, the several factors listed mean that the redemptory or positive scoring that ensues follows current dogma; merely quantifying existing perceptions as opposed to providing a fresh rethink.

There is also the issue of cause-effect confusion evident in the case of membership of certain organizations. For example the index fails to prove statistically how membership of the G-8 positively impacts scores. In many ways G-8 membership could be seen as a sub-function of transparency, given the levels of information-sharing prevalent amongst most members of the club. Yet instead of this being seen as symptomatic of transparency, the way the scoring is structured, it would seem to be a cause, not effect.

There is also a reality disconnect given that some members (such as North Korea) can never really aspire to G-8 membership or for that matter many of the other groupings listed. Similarly membership of these groupings such as China's of the NPT does not necessarily translate into adherence to its norms, given the UN report on China continuing to act as a conduit for illicit nuclear and missile shipments to and from North Korea. While the NTI's defence of this (that individual discrepancies even out in other categories) is appreciated, the quantum of such culturally-specific criterion, seen as arbitrary in

many other cultures, call into question the 'evening out' effect over the several categories of scoring.

Lastly, while recognizing the depth and scope of expertise, one must question whether the advisory committee that formulated this report represented, along with its regional, cultural and ethnic diversity, a diversity of opinion. While it is true that including such opinion could have delayed the production of this report due to interminable squabbling, the inclusion of 'rogue' or 'discordant' opinions may have strengthened the rigour of the document.

III
CONCLUSION

The Index, and its construction, has its merits and demerits. Its primary significance lies in it being the first comprehensive step towards encouraging public debate on global nuclear security standards, and this effort should not be undermined. However, the Index, like most other reports, has met with harsh criticism from several countries based on the variables and methodology adopted, as well as the information (or lack of it) used for its construction.

A critical analysis of the Index has highlighted shortcomings regarding the manner in which the primary variables (indicators) have been utilized. In an attempt to uphold the consistency of the Index and make its findings more reliable, certain variables have been given less weight. While one can understand the hesitation to allow room for value judgments in general, unresolved contradictions vis-à-vis these variables have only increased discrepancies in understanding and interpretation. Take for example the deterrence-security dilemma that transparency has evoked. In fact, it is important to mention that the problem does not lie with the 'selection' of these variables, but rather with their definitions.

Moreover, the Index endeavours to strike a fine balance between the value-laden environment of the nuclear world and the value-free testing criteria of the Index. Although the nuclear security team at the IPCS welcomes the Index's findings and interpretations, it is concerned about certain generalizations. While country-specificity is not advocated to be a part of the testing criterion (as it might affect standardization), its inclusion in the interpretation of the 'objective' data revealed by tests would have been appreciated.

For example, the 'independence' of regulatory bodies of a particular country might generate a certain value on the testing scales; however, intervening variables like the political structure of that country might add a deeper meaning to, and provide a more refined interpretation of what mere statistics denote.

To conclude, the 2012 Nuclear Materials Security Index of the NTI, as it claims, does not represent finality. While this Index was aimed at informing the NSS in Seoul, there will be future reports through continued assessments of countries' nuclear security capacities that will verify or call into question its facts and findings. For now, however, wisdom lies in appreciating the introductory effort made by the NTI and introspecting, instead of procedural criticism. The primary purpose of this report and its findings were directed towards catalyzing actions and reactions, and in this respect the NTI Index has succeeded.

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