Technology Impact Assessment for Peace and Stability in Practice: Australia and India

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***Abstract*— Since 2020, Australia and India have committed to coordinating policy on critical technologies to promote peace and stability. This is part of a deepening political, economic and strategic relationship across many sectors. One of the policy tools for managing technology policy in both countries has been that of technology impact assessment (TIA), a process that has been in existence for more than five decades. Both Australia and India would benefit from a clearer commitment to regularized TIA of critical technologies for peace and stability. This would involve organizational reform and commitment of more resources, which could be justified by reinstating peace and stability to the policy status it enjoyed in the 1990s and the first decade of this century. A drift to more confrontational relationships in international affairs in the past decade should point to the need for more investment in TIA related to maintaining stability, alongside the increasing investment in TIA for hard military capability or domestic security. This paper presents TIA mechanisms for peace and stability in Australia and India demonstrating that while there are existing approaches to TIA by government and non-government stakeholders, a lot more could be done to bring the two countries together to conduct joint impact assessment of critical emerging technologies in support of peace and stability.**

Keywords—technology impact assessment, TIA, technology assessment, peace, stability, technology policy, emerging technologies, critical technologies, Australia, India

I. Introduction

A. Technology Impact Assessment (TIA)

In English usage, the concept of technology impact assessment (TIA) has been traced back to US Congressional discussions in 1966 in reviewing the impacts of supersonic flight. The concepts of environmental impact assessment (EIA) and social impact assessment (SIA) emerged at about the same time, with the former concept being legislated in the US in 1969. By 1972, US Congress had passed the Technology Assessment Act to equip itself with "competent, unbiased information concerning the physical, biological, economic, social and political effects" of critical emerging technologies [1, p. 797]. The roots of TIA in the parliament of a liberal democracy at the time, in this case the US Congress, reflected the necessary implication of considering social and community inputs, mediated by the parliament, rather than the executive. Based on this history, there is a necessary implication that impacts (social, political, legal or economic) beyond the technical effects are integral to TIA.

This is further seen in the "New Public Management" trend of this liberal reform era from the 1980s to the early 2000s to seek review of both new and even much existing regulation and legislation via Regulation Impact Statements and Legislation Impact Statements, which could cover whatever of economic, social, environmental, political and legal dimensions was appropriate. "Political", often embraced security, peace and stability [2].

The term TIA is often used interchangeably with "technology assessment", "technology evaluation", or even "technology testing". While "technology assessment" (TA) is more prevalent in the literature than "technology impact assessment", as Clarke [3] notes, if 'consequences' and 'impacts' are treated as synonyms, Technology Assessment (TA) and Technological Impact Assessment (TIA) are equivalent.

TIA is the systematic analysis of the impacts arising from the use of technologies. This includes both specialist assessment of their technical performance characteristics and cost-benefit considerations as well as consultations across diverse stakeholder groups (such as government, industry, academia, and civil society) to determine broader social, political, legal or economic consequences. As Grunwald [4] noted in 2009, "No consensual, unambiguous and selective definition of TA has yet been provided".

B. TIA for Peace and Stability

The peace and stability agenda of most countries is, in essence, the diplomatic face of national security policy – the practices of shaping, implementing or contesting international regimes or cooperative measures to enhance national security. This includes issues related to deterrence as well as common or collective security, such as conflict

prevention, protection of global critical infrastructure, arms control, or plurilateral regimes for technology development. These issues may not lend themselves to the sort of expansive public consultation that most specialists have regarded as an essential element of modern TIA. Voters in Australia and India have not traditionally placed a high priority on the diplomacy of peace or cooperative security, where single technologies have been the main focus, except perhaps in the case of nuclear weapons. In countries where TIA is most developed, its focus has been on domestic policy concerns such as health or the environment.

The practice of TIA in support of peace and stability has emerged in various forms, with varying degrees of secrecy or transparency, and at different stages of technology development and deployment. Moreover, there are many distinctions between TIA focused on stability (e.g., as in the stability of cyberspace or shared space situational awareness) and those intended for the protection of peace (e.g., diplomatic aspects of deterrence or maintaining a geostrategic balance of technological power).

Australia and India have had quite different approaches to TIA for peace and stability, as a result of divergent priorities in domestic government policy, development models, the character of their innovation systems, governance systems and strategic policy. Sections II and III will present the current state of play of TIA in Australia and India, and provide a few examples of use. Sections IV and V will specifically consider mechanisms of TIA for peace and stability in Australia and India respectively, providing insights into who conducts them and how the TIA function is set up in both government and non-governmental contexts. Section VI will provide a succinct comparative discussion on the similarities and differences of TIA mechanisms in Australia and India, before concluding with a possible way forward toward joint impact assessment.

II. TIA IN THE AUSTRALIAN CONTEXT

Australia has a network of institutions and diverse formal processes for impact assessment of critical technologies through the lens of peace and stability. These assessments have informed decisions that range from AI governance frameworks, counter-terrorism policy, setting development priorities for the intelligence community, cybersecurity, arms control, and infrastructure bans for foreign equipment (e.g., broadband network and 5G wireless).

A. Examples of TIA

Australia's recent public practice of TIA has concentrated on health and agriculture, but this work has included some national security aspects. Such themes can also be seen in the *Horizon Scanning* series of reports on technology conducted by the Australian Council of Learned Academies, a peak body for scholarly fellowship. Conducted over the period 2017-2022, this series began with agricultural technology and energy but then moved into precision medicine and synthetic biology and across to artificial intelligence and the internet of things [5]. The *Horizon Scanning* series was commissioned by Australia's Chief Scientist (e.g., ACOLA case studies [6], [7], [8]). ACOLA continues to work on technology futures and impacts in seminars, conferences and individual reports.

Table I provides a list of TIA examples that also identify associated stakeholders, the technology under assessment and the main concern the TIA is addressing. As the list suggests, those TIA conducted by the parliament, non-executive agencies of the government, and non-government bodies are more accessible. There are certainly many undertaken by the government that are never mentioned in public, or receive only scant attention.

TABLE I. ILLUSTRATIVE LIST OF AUSTRALIAN TECHNOLOGY ASSESSMENTS RELEVANT TO PEACE AND STABILITY

Technology	**Source**	**Actors**	**Main concern**
Telecoms Security (5G)	*Review of the Telecommunications and Other Legislation Amendment Bill 2016* 9 August 2017	Government Parliament Industry Community Allies	National Security
AI	Senate, *Select Committee on Adopting Artificial Intelligence: Final Report,* 2024	Parliament Government Industry Community	National Security
AI	IGIS, *Preliminary Inquiry – Use of Artificial Intelligence by Intelligence Agencies*, 2024	Government agencies	National Security
AI	DFAT, *Australia's Submission to the United Nations Secretary-General's Report on Lethal Autonomous Weapons Systems,* 2024	Government agencies Research specialists	Peace Stability
Quantum	CSIRO, *Growing Australia's Quantum Technology Industry,* 2020	CSIRO (Government Research)	National Security
Advanced ICT	ASSA, *Social Science Research and Intelligence in Australia*, 2019	Specialists	National Security
Advanced ICT	Digital technologies impact on productivity	National (Australia)	Economic Development

B. The Hope for an Office of Technology Assessment

One benchmark for the ideal condition was laid down by the former Australian Science Minister, Barry Jones, who took office in 1983 as part of the Labour Party Government. He said his Party had committed to setting up a new Office of Technology Assessment:

> "Technological sovereignty then, is the first step in minimizing unfortunate side effects of technologies. Our platform set out others, notably public information and the establishment of two assessment and information bodies - an Office of Technology Assessment and a Commission for the Future. Information, open discussion and control of technological destiny are the essential elements in ensuring a future in which technological change occurs in a way which is both acceptable to the individual and beneficial to the community as a whole" [9].

The Australian OTA never emerged. There are still many reasons why the argument holds true today and is even more pertinent. That said, what matters most may be that governments commit to certain standards, rather than the precise format of a government agency assigned the task. Jones emphasized the primacy of people-centered technology assessment, both at the individual and community levels.

III. TIA IN THE INDIAN CONTEXT

A. Examples of TIA

The priorities for technology assessment in India have evolved significantly since the country gained independence. In India, beginning in the 1970s, the move toward institutionalization of TIA concentrated more on the health and environment sectors than on broader international integration and it was largely practiced as an intra-governmental process [10 , p. 5]. TIA focusing on environmental and community concerns became mandatory in 1994 for new nuclear energy projects, but has not been consistently applied. The Department of Health Research (DHR) under the Ministry of Health and Family Welfare initiated a pilot program on Health Technology Assessment in April 2017, which led to the formal approval and establishment of the Office of Health Technology Assessment [11].

B. Technology Adoption and Socioeconomic Factors

India has embraced technology adoption, recognizing its potential for socioeconomic upliftment of its citizens. However, historically, there has been caution and skepticism surrounding the adoption of technology. In his book, *Midnight's Machines*, Arun Sukumar [12] highlights that Jawaharlal Nehru, India's first Prime Minister, was hesitant to introduce everyday technologies that could directly enhance the lives of ordinary people, fearing that they might overwhelm or disadvantage marginalized communities.

Additionally, India's access to technologies necessary for nation-building and national security has been influenced by international relations and political circumstances. For instance, during the Cold War, export controls limited access to Western technologies because of India's non-aligned stance and its ideological proximity to the former Union of Soviet Socialist Republics (USSR) after 1972. Furthermore, India's tightly-controlled and centralized economy before the liberalization reforms of the 1990s also hindered technology adoption.

C. National Programs

In this environment, the practice of TIA in India, especially regarding issues that pertain to peace and stability, has often lacked broad public deliberation and dissemination. With India currently pursuing ambitious national programs such as the IndiaAI Mission, National Quantum Mission, and National Mission on Interdisciplinary Cyber-Physical Systems, alongside pushing for rapid adoption of Digital Public Infrastructure, the need for robust TIA mechanisms to guide informed policy and decision-making has increased dramatically over the past decade. The dual-use nature of emerging technologies and geopolitical tensions surrounding their diffusion also make TIA indispensable as a tool for stability maintenance.

IV. TIA PRACTICE IN AUSTRALIA

A. TIA for Peace and Stability

In Australia, the practice of TIA for critical emerging technologies affecting peace and stability is underdeveloped. This has been illustrated very well by a 2022 RAND report commissioned by the Defense Science and Technology Group (DSTG) [13]. The task was to "develop an analytical framework to support the prioritization of [Critical Technologies of National Interest] CTNI" [13, p. ix]. There was a blend of national security issues with those of industry development, but with a focus on the international crisis, in the event that Australia might not be able to count on the normal supply that prevails under conditions of peace and stability.

Despite the RAND report not using the language of peace and stability, it certainly addressed the terrain. The report noted the Australian government's definition of CTNI as "current and emerging technologies with the capacity to significantly enhance, or pose risk to, our national interests (economic prosperity, social cohesion and/or national security)" [14, p. 1]. The report correctly identified tensions between the country's needs in these three different domains. It said: "The competing policy objectives of security, prosperity and social cohesion suggest the need for a technology assessment for CTNI that is distinct from (but related to) parallel efforts in the Department of Defense, which primarily focuses on security" [13, p. xii].

The report identified a broad range of factors outside of technical considerations that should be influential in technology assessment, given their interdependence with technical aspects. These included infrastructure, workforce, supply chains and international competition. RAND argued for a consistent, transparent and functional decision framework that can be optimized to the circumstances of the day. They advised the government to adopt a flexible methodological approach to assessing technologies for their relevance to the CTNI criteria, "given that the nature of the policy environment is highly interdependent and both context- and time-dependent. There is no single optimal solution. Rather the result will be a 'best fit', given the circumstances of the day and the shifting perspectives of those making the assessments" [13, p. xii].

Mechanisms have included national security reviews, commissioned reports, standard-setting initiatives, and public inquiries. Unlike the US, where many public inquiries have addressed technology competition at a geopolitical level, Australian TIAs that have been published with open access have more often taken a domestic national security (stability) angle. Where the Australian investigations have crossed into geopolitical issues, these efforts have emulated those of the US in attempting to counter authoritarian agendas.

B. Primary Actors of TIA

Australia did set up the Critical Technologies Policy Coordination Office (CTPCO) in the Department of Prime Minister and Cabinet (PM&C) to provide coordinated, whole-of-government advice on technology developments, opportunities and risks, and to recommend actions to promote and protect the development and deployment of critical technologies. The Unit was subsequently assigned to the Department of Industry, Science and Resources and lost some of its political weight.

The primary actors in Australian TIA can be listed as follows, while recognizing that for any single TIA, there will be a variety of combinations, interacting through formal and informal relationships:

- Committees of the national parliament
- Intelligence agencies (e.g., ASD, ASIO, DIO)
- Executive departments (e.g., Defense, Foreign Affairs, Industry)
- Non-executive agencies (e.g., DSTG, CSIRO)
- Specialist groups (e.g., National Academies, universities, think tanks)
- Industry groups (e.g., BCA, ACCI, AIG)
- Non-governmental organizations (e.g., Electronic Frontiers Australia).

C. Committees of the National Parliament in Australia

Reports by committees of the Australian parliament come closest to consistent best practice in TIA of critical technologies for peace and stability, in terms of criteria such as comprehensiveness, specialist depth, stakeholder consultation, and transparency. The best example is from 1989, when the Senate Committee on Foreign Affairs, Defense and Trade published its report on *Visits to Australia by nuclear-powered or armed vessels: Contingency planning for the accidental release of ionizing radiation* [15]. The report, over 670 pages, was unprecedented in Australian parliamentary history for its technical depth, political breadth and considerate treatment of radical views. It has not been surpassed in these respects. Moreover, that inquiry has not been surpassed by any in Australia for the seriousness and gravity of the immediate risks to peace and stability posed by public attitudes to critical technologies.

The role of the parliamentary committees in critical technologies affecting peace and security had subsided until the beginning of the War on Terror in 2001 necessitated intrusive surveillance policies, and then accelerated again when political relations between Australia and China, and later Australia and Russia, began to break down after 2011. Interest further accelerated as US President Trump initiated the technology war with China in 2018.

Almost all of these reports on critical technology by parliamentary committees addressed general policy settings for critical technologies as a group, rather than an investigation into granular technical detail. For example, the Senate Select Committee on Adopting Artificial Intelligence tabled its report in December 2024 [16]. The inquiry was conducted in less than one year with 245 public submissions, and 72 witnesses. There was wide coverage of economic, business and social impacts, as well as some national security issues. There were only seven references to the term "national security" and none to "peace" or "stability". There was little analysis of the details of how any sub-field of AI specifically impacts national security issues.AI as a technology category has many subfields which present distinct challenges for TIA. The more established subfields include machine learning (ML), computer vision, and natural language processing (NLP). Emerging subfields include reinforcement learning (RL), generative AI, and self-supervised learning. Frontier sub-fields include cutting-edge innovations such as neuromorphic computing (brain-inspired hardware) and federated AI (decentralized learning). AI applications often rely on the integration of several of these subfields. Most countries regard AI as a potentially decisive technology for many fields of endeavor, including the diplomacy of peace and stability. In almost all countries, the practice of TIA to address the many applications of these diverse subfields of AI is a recent and still maturing undertaking, to the extent it exists at all.

Subfields can be distinguished by the type of AI technology used, such as those named above, or by the purpose. For assessment of impact, a focus on the purpose or mission of the use of the technology may be more important.

In a 2024 report, *Supporting Sovereign Capability in the Australian Tech Sector*, by the Senate Finance and Public Administration Reference Committee, there was almost no technology assessment to speak of [17]. The report replayed as fact the questionable claim from an Australian think tank that "China is the leading country in 37 of the 44 technologies evaluated, with the United States leading for the remaining 7 technologies. For a number of critical technologies, China is producing more than three times as much high-impact research as its closest competitor" [17, p. 15].

Many parliamentary inquiries canvassed critical technology issues as a very small part of a bigger economic policy agenda. This can be seen in the *Australian Government's response to the Rural and Regional Affairs and Transport References Committee report: Shutdown of the 3G mobile network: Interim Report* [18]. Passing references to technology impacts on privacy have featured in parliamentary bills amending telecommunications legislation to counter terrorist threats.

In spite of its leading position in Australia as the best single source of technology assessments available to the public and involving many stakeholders, the parliament remains somewhat timid in this area. For example, in its inquiry report into the use of 5G in Australia, the House of Representatives Standing Committee on Communications and the Arts [19, p. vii] operated under a terms of reference that deemed matters relating to national security to be "out of scope for this Committee".

D. Executive Departments in Australia

The Defense Department, primarily through ASD and its DSTG, has the primary responsibility for assessing future impacts of most technologies through a function described as "technology foresight". DSTG [20] assesses emerging and disruptive technologies, prioritizing military readiness and asymmetric capabilities under the Defense innovation, science and technology strategy. In 2022, DSTG also established a function called "Socio-Technical Futures Analysis" to assess the societal implications of emerging and potentially disruptive technologies [21]. The focal points of its modest funding announced in 2022 were to be as listed below (rendered verbatim), but there has been negligible public reporting on the unit since 2022:

1. concepts and theories that integrate or otherwise account for the interplay between emerging and potentially disruptive technologies and society;

2. comparative analysis of the consideration of social factors in international approaches to critical technology foresight;
3. analytical models for assessing the societal impact of emerging and potentially disruptive technologies;
4. methodologies for designing, developing and deploying technologies in a socially-responsible manner;
5. social analysis of technological convergence; and
6. the role of technology in preserving social cohesion in times of insecurity.

The Department of Industry, Science, Energy and Resources (DISR) leads the development and maintenance of Australia's "List of Critical Technologies in the National Interest". DISR coordinates public consultations, defines priority fields (e.g., AI, quantum, and advanced manufacturing), and aligns the list with strategic goals like economic growth, supply chain resilience, and sovereign capability. The agency revised the list in 2023 to focus on seven high-impact technology fields, informed by academic and industry input, while collaborating with security entities like the Defense Science and Technology Group. DISR also integrates the list into broader initiatives such as the National Reconstruction Fund to drive investment in critical tech sectors. DISR manages standards development, including through international standard-setting bodies.

The Defense Intelligence Organization is the primary source for assessment of foreign technologies affecting kinetic war-fighting, while the Australian Signals Directorate (ASD) leads on those affecting cyberspace. In 2022, Australia established the Cyber and Critical Technology Intelligence Centre, a multi-agency initiative within the Office of National Intelligence announced in March 2022 [22]. This center derives novel cyber and technology insights to inform complex government decision-making and harnesses cyber and technology expertise to produce all-source intelligence assessments. The establishment of this dedicated intelligence center reflects Australia's assessment that technological developments require specialized monitoring and analysis for national security implications.

V. TIA IN PRACTICE IN INDIA

A. India's Distributed Approach to TIA

India adopts a more distributed approach to TIA compared to some countries that have dedicated parliamentary bodies for this purpose. TIA functions are typically conducted by various executive departments, such as line ministries, government advisory bodies and sectoral regulators. These organizations usually conduct broad consultations with stakeholders, including academia, industry organizations and think tanks, even though the private sector often expresses dissatisfaction with the intensity of these engagements, citing a lack of consistency and depth. Table II below provides a list of TIA examples in the Indian context.

In addition to the above, on 8 October 2024, the Parliamentary Standing Committee on Communications and IT announced that during the 2024-25 sittings, it would be investigating the impact of the emergence of artificial intelligence and related issues [23, p. 2].

Whilst many line ministries conduct formal and informal TIA, the key agencies that oversee different aspects of governance of critical technologies affecting peace and stability are the National Security Council, the Department of Science and Technology (DST), Ministry of Electronics and Information Technology (MeitY), Department of Space, Department of Telecommunications and the Ministry of External Affairs.

TABLE II. ILLUSTRATIVE LIST OF INDIAN TIA AFFECTING PEACE AND STABILITY

Technology	Source	Actors	Main Concern
Quantum	*Quantum Computing: National Security Implications & Strategic Preparedness, NITI Frontier Tech Hub Quarterly Frontier Insights*, May 2025.	NITI Aayog Data Security Council of India	National security
AI	*AI Governance Guidelines Report: Recommendations of the Sub-Committee on AI Governance and Guidelines Development.* Released January 6, 2025. Open for public consultation.	MeitY Office of PSA Inter-ministerial Advisory Group Subcommittee with members from government, academia, industry and think-tanks	Technology governance Trustworthiness and accountability of AI systems
Quantum	*National Quantum Mission*, 2023	DST PMSTIAC	Capacity building
Outer Space	*Indian Space Situational Assessment Report*, 2023	ISRO	Safety Security Sustainability
IT	*Master Direction on Information Technology Governance, Risk, Controls and Assurance Practices,* 2023	RBI	Cybersecurity

B. National Security Council

For matters pertaining to defense and national security, the National Security Council (NSC), operating under the Prime Minister's Office, assumes the coordinating responsibility for TIA, reflecting the sensitivity assigned to this sector. The Defense Research and Development Organization (DRDO), which is under the Ministry of Defense, also works on emerging technologies.

As a nodal agency responsible for orchestrating long-term national security planning and fostering inter-agency coordination on critical security matters, the NSC operates as a key advisory body. It is headed by the Prime Minister, supported by the National Security Council Secretariat, and includes various wings to address diverse security challenges:

- National Security Advisor (NSA): The NSA is the Prime Minister's principal advisor on security and strategic matters and oversees the functioning of the NSC.
- Strategic Policy Group (SPG): With NSA as the Chairperson, the SPG comprises the Cabinet Secretary, Secretaries of Defense, Home, External Affairs and Finance departments, heads of military, intelligence services and key scientific establishments and NITI Aayog. The SPG is the apex decision making organ of the NSC.
- National Security Advisory Board (NSAB): Comprising a panel of domain experts from diverse fields both within and outside the government, the NSAB provides independent analysis and strategic recommendations on national security issues.
- Joint Intelligence Committee (JIC): JIC coordinates intelligence inputs from Research and Analysis Wing, Intelligence Bureau and military intelligence agencies.
- The NSC is also the nodal agency from India for the Quad Critical and Emerging Technologies (CET) Working Group.

C. Nodal Departments and Sectoral Regulation

DST is the nodal department for formulating science and technology policies, promoting scientific research and development, and supporting indigenous technology development. It has a mandate to work with various stakeholders to study emerging technologies and provide policy advice. It currently supports several mission-mode programs, such as those on cyber-physical systems and quantum. The department established the Policy Research Cell (PRC) program in 2013 with the aim of providing public policy support for strengthening the Science, Technology, and Innovation (STI) ecosystem in India. The program operates through the establishment of DST Centers for Policy Research (DST-CPR), DST Satellite Centers for Policy Research (SPR) and the DST STI Policy Fellowship Program.

MeitY is responsible for formulating regulations related to digital technologies, cybersecurity, artificial intelligence and data protection. Its initiatives are mainly related to national economic development of critical technologies (Digital India program, the IndiaAI Mission, and Indian Semiconductor Mission).

The Department of Space, working primarily through the Indian Space Research Organization (ISRO), has oversight of R&D in the sector. It has established several expert committees and working groups comprising scientists and engineers from within the organization, government research organizations like DRDO, and academic institutes for technology evaluation and mission-mode projects like the Mars Orbiter Mission. It established the Indian National Space Promotion and Authorization Centre (IN-SPACe) in 2020 to act as a nodal agency to facilitate private sector participation in the space domain.

The Department of Telecommunications (DOT) addresses the impact of emerging technologies like 5G, 6G, AI, and IoT mainly from the industrial development point of view. The Telecom Technology Development Fund (TTDF), set up under the Universal Services Obligation Fund (USOF) of the DOT, promotes research in emerging technology domains.

The Ministry of External Affairs established the New, Emerging and Strategic Technologies (NEST) Division in 2020 to coordinate India’s engagement in global technology discourse.

Sectoral regulators in India conduct domain-specific TIA. While the general focus of such TIA is assessing the impact on market stability, consumer protection, competition, and overall sectoral development, they also encompass aspects related to peace and stability. Other regulators with a stake in critical technologies for peace and stability include the Reserve Bank of India (RBI), the Atomic Energy Regulatory Board (AERB), and the Directorate General of Civil Aviation (DGCA), for regulating the civil aviation sector.

D. Government Agencies Outside the Executive Branch

Several government agencies outside of the executive branch play coordinating and advisory roles across various technology initiatives.

The National Institution for Transforming India (NITI Aayog) is India's premier policy think tank. It shapes policy direction for technology governance. Its initiatives include the NITI Frontier Tech Hub (NITI-FTH) to foster engagement with experts across industry, academia and the government to assess the impact of emerging technologies, and the Science and Technology Division to strengthen India's STI ecosystem.

The Office of the Principal Scientific Adviser (PSA) serves as the chief authority for providing pragmatic and objective advice to the Prime Minister and the Cabinet on matters related to STI. It is supported by the Prime Minister's Science, Technology, and Innovation Advisory Council (PM-STIAC). This council is chaired by the PSA and comprises eminent experts across diverse domains from both within and outside of the government, with the heads of key government departments serving as special invitees. It is an overarching council that assists the PSA's office in understanding challenges and formulating interventions.

The Empowered Technology Group (ETG), chaired by the PSA, comprises the heads of Atomic Energy Commission, Space Commission, DRDO and the departments of Electronics & Information Technology, DoT and DST. The ETG is further supported by a Technology Advisory Group (TAG) comprising of experts from academia and industry. It operates on three main pillars: (1) Policy Guidance, (2) Procurement Support, and (3) R&D Support.

E. Other Expertise

1) Expert Panels And Public Academic Institutes

India has also followed the practice - now less frequently observed - of constituting expert panels to provide guidance on technology governance. Some examples include the AI Task Force, Justice B.N. Srikrishna Committee, and Non-Personal Data Governance Framework Committee.

Traditionally, the Indian government has relied heavily on the expertise available in public academic institutes for support with expertise in emerging technologies. Institutions, such as the Indian Institute of Science (IISc), and the Indian Institutes of Technology (IITs), have long served as key knowledge partners for various ministries and departments. Whilst there has been a gradual openness in government for

collaboration with private academic institutions, such engagements remain limited.

2) Industry Perspectives

As Indian industries continue to mature and increasingly match global standards, they have developed significant expertise across various emerging technologies. This growing technical capacity positions them well to provide informed, strategic support to the government in shaping technology-related policies. Traditional industry bodies like Confederation of Indian Industries (CII), Federation of Indian Chambers of Commerce & Industry (FICCI) and Associated Chambers of Commerce and Industry of India (ASSOCHAM) continue to support the government in various policy-making aspects, and have constituted sector-specific wings. Meanwhile, sector-specific industry bodies in domains of emerging technologies, like National Association of Software and Service Companies (NASSCOM) in IT, Data Security Council of India in cybersecurity, Association of Biotechnology Led Enterprises (ABLE) in biotechnology and Indian Space Association (ISpA) in space, are actively involved in policy advocacy and offering support to the government with policy formulations.

3) Think Tanks

The Indian government, historically, has collaborated primarily with government-funded think tanks for policy research, advisory support as well as technology assessment. However, the advent of privately funded think-tanks in the last couple of decades has contributed to the policy discourse by introducing independent perspectives, diverse skill sets and a multi-disciplinary approach. While their involvement varies in scale and formality, think tanks increasingly shape the narrative and substance of technology governance, particularly in areas where institutional capacity within the government is still evolving.

VI. Discussion

Australia and India have well-established capabilities and processes for technology impact assessment in sectors like health, energy and the environment. Both countries accept in principle the need for multi-stakeholder consultative approaches that have been fundamental to impact assessment in advanced liberal democracies for four to five decades. In the field of critical technologies affecting peace and stability, these assets are rarely applied in the two countries, with variable consistency depending on a range of choices about the priority of the subject and the resources available. Neither Australia nor India has the resources to undertake comprehensive TIA for every one of the technologies they have identified as critical. This is an even more important consideration when we ponder the numerous and diverse subfields of new areas, such as AI and quantum technologies.

In both countries, the practices of TIA for peace and stability have a lower priority than TIA for national defense and domestic security. Nevertheless, the policies of both Australia and India in the area of critical technologies for the peace and stability pillar are relatively new, and will need time to be further refined. Neither country has committed to a standing mechanism for executing high-quality TIA, or to greater clarity through a set of best practice standards in the field.

At the same time, both Australia and India would probably benefit from the existence of a new center of gravity for TIA for the peace and stability pillar, separately from other aspects of national security- where secrecy requirements mitigate against public impact analysis. There would appear to be a small set of options for locating such a center of gravity with a degree of independence from government: the national parliament, a statutory authority, or the national academies.

This consideration gives rise to a need to consider burden-sharing between national institutions on a proactive basis. While the normal process of democratic consultation in an advanced TIA creates an opportunity for that burden-sharing, with stakeholders offering their own detailed TIA, that is not happening in practice. Leading organizations that might be expected to offer their own TIA at an advanced level as part of a national effort do not always rise to the standard.

Nonetheless, given the importance by definition of critical technologies, the need for obtaining wider community support for new policy, and the dearth of fully comprehensive analyses, including for peace and stability, some priority for enhancement of the capacity in this area seems clear. In that process, if cross-national collaboration could be agreed, the pay-offs might be very much enhanced.

VII. Conclusion

Most countries now face choices about where in the machinery of governance the most effective forms of TIA for peace and stability can be seated: in the national parliament, in government agencies or statutory authorities, and/or in specially convened task forces or commissions of inquiry representing diverse specialists and stakeholders. The minimum requirement would appear to be a recognized institutional center of gravity for TIA in each country and a set of basic principles. Both Australia and India would benefit from a clearer commitment to regularized TIA of critical technologies for peace and stability. This would involve organizational reform and commitment of more resources, which could be justified by reinstating peace and stability to the policy status it enjoyed in the 1990s and the first decade of this century. A drift to more confrontational relationships in international affairs in the past decade should point to the need for more investment in TIA related to maintaining stability, alongside the increasing investment in TIA for hard military capability or domestic security.

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