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HARNESSING TECHNOLOGICAL INNOVATION FOR NATIONAL SECURITY: UPGRADING INDIA'S INSTITUTIONAL TOOLKIT

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Introduction

The guest speaker explained that niche technologies have added a new dimension to warfare. They impact the soldiers in conflict zone and civilians in near similar manner. Innovation Power is the ability to invent, adopt, and adapt new technologies. There is a need to consider, why and how to build innovation power to guard our national interests in the new technological environment. This can be done by operationalising technology policy ideas.

Innovation Power is an essential component of the strategic calculus today. It is not less important than building sea power, land power and air power. However, there are few major challenges which need to be positively handled.

Today's Dominant Emerging Technologies are Redefining

These technologies are decision-making by themselves and anyone can access them in the beginning and therefore, the first mover has an advantage. Before talking about strike capabilities, it is this decision-making cycle that's been cut short due to the niche emerging technologies. Therefore, there is a need to shift from our strategic culture of deterrence and hack the Boyd's loop ie Observe, Orient, Decide, Act (OODA Loop). Speaker mentioned about trials of an Indian system that uses not only cameras and drones but the face and gesture recognition technology based on AI and machine vision technology to recognize gestures, recognize and make assessment of a threat in an automated fashion. In addition, the speaker also mentioned about analysis of incident logs maintained along the Border Outposts to establish a pattern of various construction and logistic activities using AI with embedded prediction. The Speaker covered modern targeting systems like the Israel's Hasbora (Gospel) system and the Lavender system which supported identification of Hamas and PIJ functionaries using drone footage, communication intercepts and behaviour pattern analyses. However, the key and difficult question remains collateral damage. He mentioned about use of robots like Extreme Parkour for move of various equipment and material in difficult terrain.

Technology Development is Helical rather than Linear

We have been used to linear technology development cycles. However, the niche technology development is helical which has multiple strands of actors working together from the very beginning for iterating around a use-case. Startups and innovators are helping the military define problems.

Triple Helix Model. Industry/start-ups have the complementary assets for product development, production and marketing. End-user provides insight, engagement and control of proprietary standards. Government does the control of regulatory standards, facilitating factor inputs to IP generation/ value capture whereas the R &D Labs & Universities have the Intellectual property, technical expertise, skill sets, talent pool for startups with facilities of equipment, Data sets etc.

Emerging Technologies Drive their Own Improvement. A tank does not build a better tank but AI builds a better AI. Similarly, a quantum chip builds a better quantum chip. Whoever moves first has the first mover advantage. AI systems development requires data sets and if they are not shared and developed today, the same cannot be done tomorrow. AI tends towards monopoly and it leaves us in a potentially a tragic situation if we haven't taken timely actions.

Technology Development is no Longer Difficult. The Speaker highlighted that the barriers to entry for technology development are lower due to which speed and agility dictate the growth.

India needs to Catch up across the Helix

India ranks 14th in the Global Top Ranked AI nations, a distant fourth globally, in recent quantum research output and ninth in producing publications on Quantum Technologies. What is alarming that India ranks nowhere on converting quantum research into intellectual property for commercialisation, with no Indian organisations in the top 20 patenting list of Quantum Technology for the year 2023. Our innovation capacity fundamentals need strengthening through increase in publications, share in global citations and H index.

The Speaker highlighted that we have a lot of technology available and also the people who want to buy it but we just can't seem to get enough cash/investment support. A number of great technologies die out and lead to constant frustration and emergency procurements, upper time and alike. We as a nation require a new programmatic toolkit and a new organisational model to address this challenge.

Few Key Technology Policy Principles. We must shift from - 'we give specifications, you build the kit' or 'we want it perfect the first time'. There must be no elongated development cycles and a reduced 'emergency procurement' which feeds the external developer. Emerging technology value capture is defined by risk and complementary asset control.

Toolkit Focus 1: Early Adoption. There is a need to engage adoption risk, signal early demand, buy early and iterate with the developer. We require a Technology Road Mapping in near (1-3 years), Mid (3-5 Years) and Far Term (5-7 years) through Government Support, Industry R& D focus for Industry product development (Startup solicitation grants), Applications (joint use case development) with threat profile and trends. There is also a need for collaborative solicitation grants and investing early

with less government funding, de risking grants, driven by user solicitations and raising more procurement funding through Ministry procurement grants and consortium-based procurement.

Toolkit Focus 2: Scale-up Agency Risk. Converge the triple helix from the beginning. Participative agenda setting ie unified R&D and industry consortia, participative planning to align R&D, Industry competitiveness goals, participative management for visibility and guidance and lastly participative funding and operations are a must. Industry technology competitiveness consortia are required for participative decision-making by letting joint interests shape applied R&D by Govt, R&D and industry consortia.

Toolkit Focus 3: Data Management. Data management is critical to innovation power through technology risk. Therefore, Treat data as an asset, build data trusts and overcome cold-start issues. Data curation is not usually seen as vital to defence / security preparedness but it will have to become a standard tool. ‘Data moats’ are essential to ‘cold starting’ platforms for seeding and securing early innovation competitiveness. Data from the government will give Indian AI startups the ability to rapidly exploit our full stack capability by adapting existing technology to defence / security use-cases.

Toolkit Focus 4: Iteration.There is a need to iterate, iterate more and continue to iterate