Public Lecture on
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This is a huge and topical subject. Broadly, there are eight segments in my presentation.

Technology virtually rules our lives today and this feature is likely to become even more prominent going forward. It impacts all countries, peoples, problems and can be part of the solution facing nation states and the world at large. It can also be part of the problem, particularly if it falls into the wrong hands.

Let me begin by spelling out what I believe is the causal link between the role of technology and Indian foreign policy.

India's foreign policy objectives can be in brief be summarised as the need to ensure the country's sovereignty, territorial integrity, development interests, system of plural democracy, an open and equitable world order and ensuring peace, stability, prosperity and security in our region and the world at large.

I trust you will agree with me that technology has an essential role in addressing most of these objectives. It must be a fundamental part of policy formulation and act as a multiplier, be it in matters of defence, security, development, or international collaborations. For example, effective defence requires constant upgrading of the tech components of weaponry as also of strategy and tactics. Productivity increases in the economy come naturally with the use of technologies.

Technology is an essential instrument to be put to effective use particularly for a democratic country as large, diverse and complex as India. It transcends divisions and disparities and enables solutions that are neutral. Take for instance the use of EVM machines in our electoral processes. It also itself defines the role that it plays in foreign policy messaging and implementation, more so in today's world of almost instantaneous communication and disinformation.

Let me now first address, in brief, some clearly manifest multinational aspects of the inexorable impact of technology and technological change.

Governments across the world are scampering to find ways and means to control the use to which advances in technology can be put to common societal benefit but are invariably falling behind the curve on account of the speed of technological change and the fact that new technologies are largely being developed in the private sector especially in the democratic world.

For governments, control over new technologies is essential to maintain the power that nation states wield in terms of their constitutional obligations to society etc and this is being challenged not only by competing nation states but also by the mammoth technology and social media companies that today dominate the international economy, communications and security domains more than ever before. These companies include Apple, Google, Microsoft, Nvidia, TSMC, Intel , Tesla, Samsung, Broadcom, Oracle and Cisco. The social media giants include Facebook, YouTube, WhatsApp, Instagram, We Chat, TikTok, Facebook Messenger, Douyin, Telegram, Snapchat, Sina Weibo, X etc. The role and impact of the Dark web and hackers only adds to the challenge.

Separately, the new AI and ChatGpt applications are threatening to make the need for human thinking irrelevant.

AI and autonomous weapon systems can become game changers in the manner in which warfare is conducted.

New developers of technologies and applications of technology that have military spin-offs such as SpaceX have already demonstrated that they can independently impact the conduct of war.

Independent, private satellite systems have effectively destroyed the monopoly of governments over the gathering and provision of satellite data for all kinds of purposes.

The rivalry to control technology and technological development has sparked off a kind of tech Cold War between the West and China. The scramble by the U.S. and its partners to control for instance the supply chains in the critical semiconductors sector and deny/limit access to China is part and parcel of this new technological CW and is intended to undo or mitigate the economic, defence and security frailties that have arisen in their systems on account of unfettered globalisation and the ability of one rising great power to game the system to its unilateral advantage and in the effort to dominate.

Technology has clearly enabled those that develop and control it to become alternative centres of power and this is being manifest in real terms in the economy, in politics, in defence and security issues, in the media/social media dimension and on issues of the global commons. Those that control technologies wield more power than most governments. And

there is no real international consensus on how technology and its constant and quantum growth can be managed or controlled for the greater good of mankind. The effort is on though but no easy outcomes are on the horizon since the struggle among the big powers is for seeking long term benefit and control. The Ukraine war and the resulting stand-off between Russia (supported by its partnership without limits with China) and the West have only further confounded matters. Resolving this conundrum is thus going to be a major challenge before the international community and multilateral institutions.

The ongoing efforts by the West led by the U.S. to restrict or deny high technology developments to countries such as China, Russia, Iran, DPRK etc. underlines the importance of technological matters in international relations and in the foreign policy of major powers. This latest western move vis a vis China is ironic at best, since the very rapid Chinese development in recent decades was the result of virtually unfettered access by China to western technology including dual use; an access denied to democratic India since our peaceful nuclear tests in 1974.

You will justifiably ask whether the relationship between technology and foreign policy is a completely new phenomenon and what does all this have to do with foreign policy? I would suggest for your consideration that there is virtually an inexorable link between technology and foreign policy. And it is not new.

If you hark back to the era of colonial conquest, you will recognise that it is improvements in maritime technology and weaponry that enabled this. The irony is that most colonial empires were controlled with minimal physical presence of the conquerors. +++++++ The draining of India's wealth by its colonial masters is well established and documented and needs no elucidation. India's domestic industry was emasculated so that it could not pose a challenge to English industry.

There are also much more recent examples of the denial of technology that have impacted India's foreign and development policies. Let me highlight two of those.

Soon after independence, when India sought to develop its heavy industry and the public sector in preference to the development of the private sector, it was largely denied assistance in this effort by the western powers and thus turned to the then Soviet bloc instead.

This was a foreign and economic policy choice necessitated by India's economic and technological choices. This had both upsides and downsides that impacted India's growth and foreign policy choices. The policy choices have since the 1980s evolved and changed with the concomitant impact on the focus of Indian foreign policy. The latter were palpably visible following the end of the Cold War in 1990 at which time we liberalised and became more participative in the global economy.

A second critical example of the impact of technological choice by India on its foreign and economic policies happened after May 1974, after India had conducted its peaceful nuclear test intended for developmental purposes following which the West imposed wide ranging dual use sanctions on India which remained in place till very recently when the India -U.S. nuclear deal was done in 2008. I am told that many such sanctions though still remain in place. Our tests were undertaken to establish technological parameters that would help our development and instead efforts were made to isolate us internationally and constrain our development.

What is worse, following our tests in 1974, the Nuclear Suppliers Group, which included the then USSR(!), was established in 1974 itself as a direct consequence to ensure that nuclear exports are carried out with safeguards to ensure nonproliferation of nuclear weapons by countries like India. India was obviously kept out of this Group, but China is a member since 2004! And India is still not a member of the Group in spite of our nuclear agreement of 2008 with the U.S. China continues to veto our membership.

The developmental and foreign policy implications of such denial of technology are clear and so were the consequences for India's development programs, including technology development for nuclear power generation. Every cloud though has a silver lining and the denial of technology to India in this sector meant that we have developed our own independent nuclear power technology capabilities. Also, a robust space program.

India's development and foreign policy choices may probably have taken on very different trajectories had it not been for the extensive dual use sanctions imposed on her since 1974, irrespective of her impeccable democratic credentials. It was a punishment imposed for more than one reason, including the fact that she had stayed out of the Nuclear Non-proliferation Treaty of 1968 and pointedly drawn attention to that Treaty's inherent hypocrisy.

Let me now briefly address the question of why technology is so important a factor for us all and especially for developing countries.

Technology has always been and is even more so today an agent of change. Here again, change can be for the better or for the worse. It can for instance create greater inequality as has been happening between the developed and developing world or can be harnessed for global good. This latter is perhaps the greatest challenge before all foreign policy establishments, multilateral institutions, civil society institutions and multinational economic and technological corporations.

At the very least, the use of technology must be denied to inimical non-state actors, terrorists, people and drug smugglers, cyber criminals, fundamentalist groups etc.

At the same time critical issues of food security, energy security, cyber security, climate change, environmental degradation and peaceful use of outer space and the oceans must be addressed as a priority.

Developing countries must have equitable access to technology and scientific developments.

One of the challenges before Indian foreign policy will be to continue to be proactive on all these and related issues of interest not only to itself but also to the Global South.

The problems of developing countries need application and constant upgrading of technologies if their progress is to be expedited. This is a fundamental issue. Rapid economic and social development in these countries is perhaps the most fundamental of human rights that must be guaranteed. And technology properly applied can be both a game changer and development multiplier; enable cost effective solutions and ensure transparency and outreach.

India has been contributing to this process, including via sharing our technological developments, over the years with fellow developing countries be it in our neighbourhood, in the Indo Pacific, in Africa and elsewhere. As our capabilities have grown, so has our partnership with these countries.

Let me now try and look at how GOI formally looks at the subject we are addressing.

Speaking at the Global Technology Summit on 05 December 2023 India's EAM said: "Now, while there have been undeniably enormous changes on the domestic side, technology has also been very much in the forefront of diplomacy, of foreign policy. It is today, I would say, reflected in how often we talk to our partners about reliable and resilient supply chains and what would be India's role in that new sets of chains that are being built. Or, in fact, in the conversations about critical and emerging technologies. And it could have, you know, cascading impact in other areas. I find, particularly in the last year, many more countries are interested in mobility discussions because the world of technology is also accelerating the world of mobility."

Mobility in the technology sphere is yet another and very important aspect that Indian foreign policy has been addressing in recent years by entering into appropriate agreements with countries for providing access, employment, and social security for skilled Indian professionals.

Earlier in January 2020, MEA established the New Emerging and Strategic Technologies Division with the objective of "looking at emerging technologies which have strategic implications, assessing their foreign policy implications and assisting internal stakeholders in India in their demand driven technology pathways." (MEA A.R. 2022). There are also divisions in the Ministry dealing with cyber diplomacy, economic diplomacy, eGovernance &

IT and multilateral economic relations. Technology permeates through the work of all such divisions.

No country though can be an island unto itself on the issue of technology. There is need for collaboration.

It is clear that there is recognition in government that the rapid pace, content and depth of ongoing technological developments must be not only taken cognisance of but also leveraged to meet India's foreign policy, security and developmental objectives. This will require working together with those leading the charge in technology development, i.e. the private sector across the world, but also with other concerned governments and institutions that are engaged in ensuring that technology is harnessed for peace, development, and common security; that its misuse is prevented if feasible or else controlled. An example of the latter is the US-EU Technology Council. The latter is of course also driven by their combined effort to deny China unfettered access to technology that it has benefited from in the past to now become the West's principal security and economic challenge. (Not very different from the China challenge facing India.) But the intent is also to ensure that governments do not loose control to the tech giants over day-to-day governance.

There is thus need to establish agreed multilateral systems to correctly channel how new technologies are being put to use; to ensure that they contribute to international peace, stability, security and development. This applies across the board, whether on the issue of data flows and use of data, on application of technologies to fight climate change, use of AI for productive purposes. So too with respect to green hydrogen, NEVs, new materials, quantum computing, life sciences, the digital economy, production of semiconductors etc. The criticality of preventing misuse of these technologies by non-state actors cannot be emphasised enough.

The big tech companies and the other large corporations, including defense equipment manufacturers, already exercise powers well in excess of those by most sovereign governments. It is no surprise or accident that the CEOs of these corporations enjoy preferential access to HOS/HOG all across the world. You would have noted for instance the extended meeting XJP himself had with US CEOs during the recent CDF meeting in Beijing. It is no different in India.

Foreign direct investment and the technology it brings with it, is a major component of development in most countries and is of particular importance to countries like India whose economic and social development needs to be sustained on a high and long-term trajectory.

Indian foreign policy has to necessarily address itself to these new challenges and circumstances presented by the rapid pace of technology development in an era of globalisation. What complicates matters further is that post the Covid pandemic & Chinese actions and the war in Ukraine, the effort, particularly in the West, now is to reorient the processes of globalisation to put in place more secure and resilient supply chains. We need

to be part of these and are working in that direction via for instance QUAD, IPEF, critical minerals supply chains etc.

I am speaking of reorienting the process of globalisation deliberately. There is not enough empirical evidence so far to establish that deglobalization is now under way.

A recent report by DHL on Global Connectedness in 2024 suggests that while Russia and Europe have decoupled and flows between the U.S. and China have declined, globalisation has not given way to regionalisation and with respect to trade, only North America shows a clear near shoring trend. Perhaps most importantly, the report also suggests that the world's absolute level of globalisation remains limited and domestic flows still far exceed international flows. The latter has implications for India's trade and investment policies going forward.

Following the Chinese perfidy in East Ladakh in June 2020, India has also to make efforts to reduce its dependence on China for a series of technology heavy inputs for its infrastructure and electronics industries. Also, for electric vehicles. This challenge is proving to be more difficult to address since dependencies have been allowed to grow. This to my mind was the outcome of a lack of understanding of its strategic implications and based on misplaced trust in China both by our industry and government. Bottom lines seem to have prevailed. This challenge though cannot be left unaddressed by India's foreign and economic policy makers and Indian industry. Steps are reportedly being taken to do that and will need to be systematically followed through.

The challenges posed to sovereign governments by the unprecedentedly rapid and continuing developments in technology have to also be addressed multilaterally or till such time as international consensus is arrived at, via smaller plurilateral or bilateral agreements. This is going to be a major challenge for Indian foreign policy. Our positions will have to be formulated on the basis of a strategic, all of country, approach. Technology respects no silos.

Several steps have already been taken in this respect. India has set up trade and technology committees at ministerial level with major technology country sources such as the U.S. and the EU.

India has also established at ministerial level, 2+2 dialogues of the Foreign and Defence Ministers with all the QUAD countries. Defence technology issues form a core part of these dialogues. As do critical and emerging technologies. In this context it is important to understand the critical need for India to reduce its supply dependencies on foreign suppliers for its principal defence requirements. The symbiotic relationship between technology and modern defence capabilities bears emphasising.

You are all no doubt familiar with the iCET (initiative for critical and emerging technologies) with the USA. The latter has already delivered concrete outcomes pertaining to the GE F414

aircraft engine for the Tejas Mark 2 aircraft for the IAF. It covers technology transfer and production. This is a major step forward. Other equally critical collaborations are intended to follow across Quantum Computing,AI, high performance computing, defense innovation & tech cooperation, building of resilient semiconductor supply chains, space and next-gen telecommunications. This latter will require purposeful follow up.

With the EU, the dialogue covers strategic technologies, digital connectivity, clean & green energy technology, resilient supply chains etc.

In terms of the QUAD, you may recall that when it was revived in 2017 its purposes included reckoning with the most urgent global challenges including climate change, critical technologies etc. and as an alternative source of public goods in the Indo-Pacific region. It seeks to deliver practical benefits in health, technology, digital connectivity, infrastructure, climate change, economic resilience, and maritime security. It is making steady progress in its efforts. The third Quad Summit in Hiroshima on 20/05/2023 reiterated the joint commitment to forge ahead with their plans for the strengthening of agreed QUAD activities. Technology underscores virtually all the areas of collaboration.

India, as you are aware is also a part of the IPEF for Prosperity. India has chosen so far not to be a party to the trade pillar but is to the pillars relating to a fair economy and clean economy. Texts on these subjects have been negotiated. The latter agreement on clean economy pertains to mitigation and adaptation to climate change and is understandably tech heavy. It covers clean energy technology development and capacity; electrification, regional grid inter connection, energy efficiency and conservation; and a host of other practical actions.

At the UN, work is underway to negotiate a Global Digital Compact to be agreed to at the Summit of the Future in September 2024. The Compact is expected to "outline shared principles for an open, free and secure digital future for all". This is intended to be done through a technology track involving all stakeholders. India is actively involved in the consultations and supports an inter-governmental nature of the GDC process leading to a framework for leveraging digital technologies for development rather than an overarching binding legal document to govern all areas related to ICT/ digital technology. The latter may actually be a non-starter given the nature, diversity and ongoing speed of digital transformation.

Separately, during its Presidency of the G-20 last year, India was able to successfully focus, inter alia, on technological transformation and Digital Public Infrastructure (DPI). The concerned G20 ministerial meeting had managed to arrive at a consensus on how to effectively shape DPI. As a result, at the second Voice of Global South Summit in November 2023 a Global DPI Repository was launched. Currently, the GDPIR features 54 DPIs from 16 countries (https://www.dpi.global)

In our bilateral relations with various developing countries, technology-based exchanges form part and parcel of our cooperation programs with them, be it in our neighbourhood, in SE Asia, with the Gulf countries, with partners in Africa, the Pacific Forum and Latin America. This now extends increasingly in the fintech sector also.

Let me now turn to the daily grind of foreign policy and diplomacy. This requires, inter alia, projecting India's achievements, learning about and assessing the internal &external developments in countries around the world, looking for opportunities for India's trade and investment in both directions, keeping a close watch on technological and scientific developments of interest to India, assessing the security/military threats to India including in the cyber domain, looking after the interests of our diaspora etc.

This was difficult enough to do in the past and often required for instance, ponderous study, the creation of a network of contacts and friends. Speed was important but today, given the mind-boggling developments in IT and the lightning speed of flows of both information and disinformation this has become a particularly onerous task. You often have to run to stay in the same place.

Live pictures appear before you of some developments or incidents and you begin to think of responses but before you know it, you find that the images have been doctored! The added dimension to the problem is that everyone in the chain of command has the same information at the same time! Often the pressure to be seen to be responding means mistakes can be made.

In the spread of disinformation, it is not only non-state actors, including terrorists, that are culpable. Nation states, corporations, some NGOs, terrorists, human smugglers, hackers and woke individuals etc. all play this dangerous game for their own nefarious ends.

Conduct of foreign policy in this era of interconnectedness and constant technological change has also other major problems to tackle. For example, compromise of your secure communication networks, cyber security and monitoring possible cyber-attacks on infrastructure, physical and financial. Cyber-attacks represent a really very formidable threat and responding to these requires extremely close coordination with own agencies, major tech companies and friendly foreign governments. There is really no escaping the downsides of the misuse to which technology can be put.

A very current example of this is the warning issued by Microsoft of intended Chinese plans to interfere in the forthcoming general elections in India and the U.S. Presidential elections.

As you are undoubtedly aware, Russia has frequently been accused of attempting to interfere in democratic elections in the U.S. and some European countries.

Technology has perforce made most serious foreign offices nimble and more efficient. They really don't have much choice particularly in democracies for they are often at the receiving

end. Their work has simultaneously been facilitated and made more difficult and demanding. It is not easy to even stay on the curve, leave aside move ahead of it on a consistent basis although that has to be the objective.

Let me now conclude.

Security issues have in recent years regained pole position in international relations to the detriment of development issues. What is crucial though, is that technology is now playing an ever more vital role in both these separate but related facets. It is thus axiomatic that all serious governments must contend with how best to put technology and its very rapid development across virtually all spheres of human activity to national and international benefit, including on critical issues of the global agenda such as climate change, pandemics, food security, natural disasters, and other major challenges.

Indian foreign policy has been addressing a series of challenges over the years and has become more active in looking at the implications of technological developments for our foreign, security and economic policies in recent years. However, the pace of change is now so rapid that perhaps there is need for being ever more proactive so that we try and remain ahead of the curve. That is no doubt the intention but will require the ability to be able to respond imaginatively, proactively and scientifically to the demands imposed by a divided world where the speed of technological change is unrelenting and unforgiving.

It will require ever greater partnership and collaboration with technology developers, corporations and like-minded countries. It will require participating actively in the evolution of multilateral or plurilateral institutions and international agreements to channel technological change for national and global benefit on an equitable basis and following extensive consultations with all stakeholders.