CBRN Weapons

Security Challenges and Their Control

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Trade Controls for GUAM Countries
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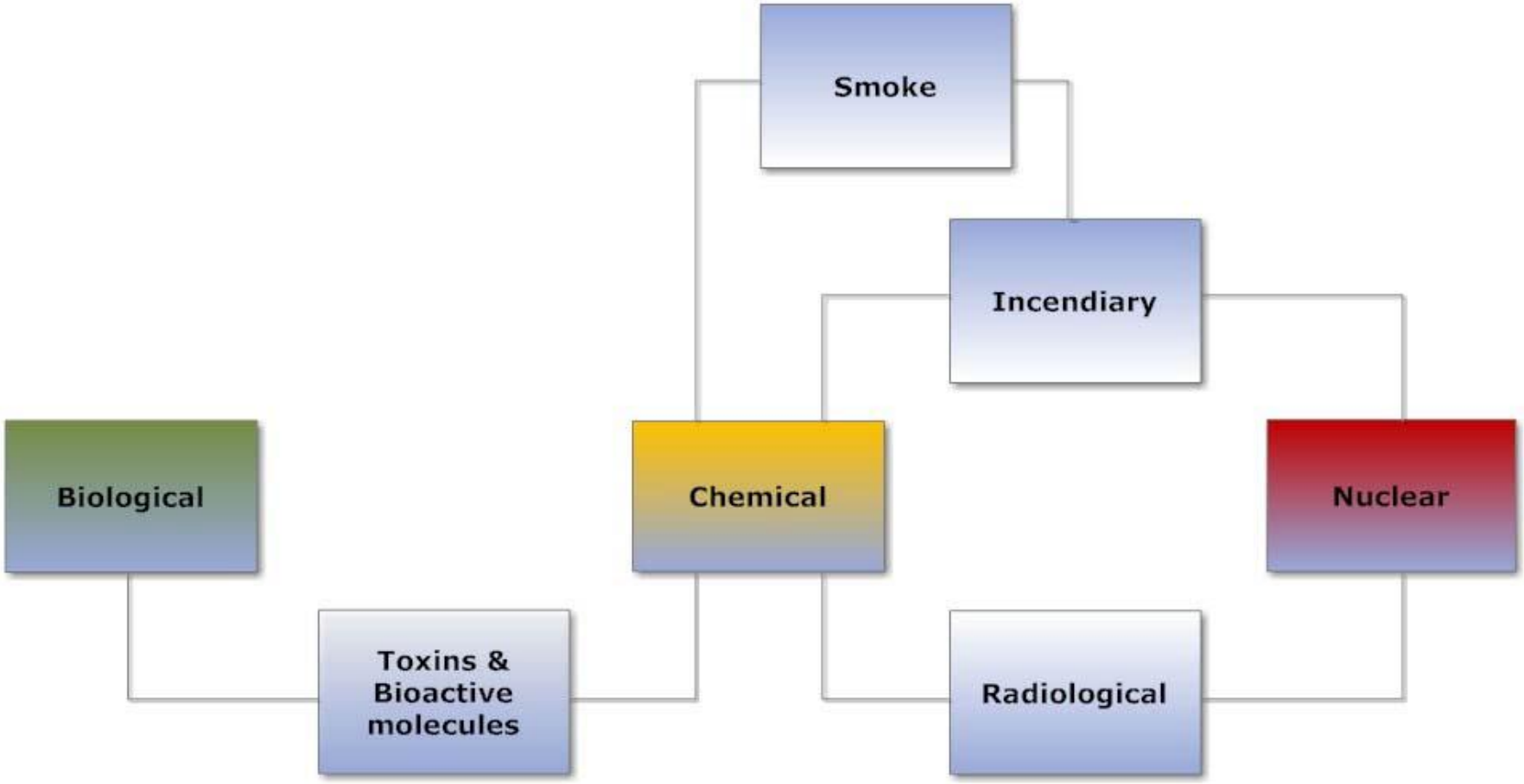
Part 1

WHAT IS '*CBRN*'?

An acronym never to forget

- **CBRN: a collective term for 4 distinct weapon categories**
  - **C**hemical weapons
  - **B**iological weapons
  - **R**adiological weapons
  - **N**uclear weapons
- **Nevertheless, the boundaries between the weapon categories are fuzzy**
  - Certain weapon types share characteristics with two of more main weapon categories, e.g.
    - Toxins, radiological weapons, smoke, incendiary weapons
  - Weapon evolution and history of military organisation have had an impact on the delineation of categories, e.g.
    - Why are CBW often uttered in the same breath?
    - Why do many people view smoke and incendiary weapons as CW?
    - Why are toxins covered by two major disarmament treaties?
    - Why are RW viewed as a main category?

The CBRN spectrum



Understanding the spectrum – 1

- **Chemical weapons**
  - Ranges from irritants (e.g. lachrymatory agent) and incapacitants (e.g. BZ & fentanyl) to the most toxic nerve agents (e.g. sarin & VX) or toxins (e.g. ricin & saxitoxin)
  - Core aspects of the CW definition in ***Chemical Weapons Convention***:
    - Any toxic chemical which through its chemical action on life processes can cause death, temporary incapacitation or permanent harm to humans or animals (Plants not mentioned!)
    - Also covers precursors to such toxic chemicals
    - Delivery systems and specialised equipment
  - CWC definition is based on the ***General Purpose Criterion***
    - Covers past, present ***and*** future toxic substances
    - Does not distinguish methods of synthesis or whether an agent may be naturally occurring
- **Biological weapons**
  - Ranges from incapacitating agents (e.g. salmonella) to lethal ones (e.g. anthrax bacteria or smallpox virus) or toxins (= overlap with CWC)
  - Core aspects of the BW definition in ***Biological and Toxin Weapons Convention***:
    - Microbial or other biological agents, or toxins (human, animal and plants)
    - Weapons, equipment or means of delivery
    - Understanding evolves through common understandings reached at 5-yearly Review Conferences (e.g. inclusion of subcellular particles and bioactive molecules)
  - BTWC definition is based on the ***General Purpose Criterion***
    - Does not distinguish between origin or method of production
    - Covers any relevant development in synthetic biology, genetic engineering, etc.

Understanding the spectrum – 2

- **Radiological weapons**
  - Ranges from radioactive offal from hospitals or radiological centres to materials from the core of nuclear reactors
  - No formal international legal definition; there may be definitions of radioactive materials in national (criminal, environmental, health, etc.) law
    - With a few exceptions, RW were never really considered as a military tool
    - Impact of terrorist action with RW is seen as limited, even though one cannot ignore psychological or economic consequences
    - Decontamination would be complex and potentially costly (also in view of public concerns)
- **Nuclear weapons**
  - Ranges from portable nuclear demolition charges to the 50Mt Vanya hydrogen bomb (Tsar Bomba)
  - No universally accepted legal definition
    - Some definitions are included in regional ***Nuclear Weapon-Free Zones*** (but phrasing may differ)
      - Southeast Asia Nuclear Weapon-Free Zone Treaty and Treaty for the Prohibition of Nuclear Weapons in Latin America and the Caribbean define '***nuclear weapon***'
      - African Nuclear Weapon Free Zone Treaty and South Pacific Nuclear Free Zone Treaty define '***nuclear explosive device***'
      - Central Asian Nuclear-Weapon-Free Zone defines '***nuclear weapon or other nuclear explosive device***'
    - Legality of NW possession essentially regulated via ***Nuclear Non-Proliferation Treaty***
    - Equipment and materials regulated via Safeguards Agreements administered by the ***International Atomic Energy Agency*** (different treaty from NPT) to ensure their application to peaceful purposes
    - Nuclear Weapon States as defined under the NPT have a different legal status from Non-nuclear Weapon States

Part 2

WHAT ARE THE PRINCIPAL *INTERNATIONAL CONTROL REGIMES*?

Main prohibitions against CBW

- **1925 Geneva Protocol**
  - Prohibits the use in war of CBW
  - Marginalised CBW in military doctrine → foundation for disarmament
- **1972 Biological and Toxin Weapons Convention (BTWC)**
  - Comprehensive ban on development, production and possession of BW and toxin weapons
  - Ban on BW use in Geneva Protocol + Final Declaration of 4th Review Conference (1996)
- **1993 Chemical Weapons Convention (CWC)**
  - Comprehensive ban on CW development, production, possession, and use
  - Also covers toxin weapons

BTWC and CWC

- **Definition of the weapon under consideration**
  - Demarcates applicability of treaty
  - Lays foundation for the verification system
- **All dimensions of the ban on development, acquisition and possession covered**
  - Backward-looking dimension (destruction of weapons & related infrastructure)
  - Forward-looking dimension (prevention of future armament)
  - Application of the ***General Purpose Criterion*** in the definition
  - Prohibits use under any and all circumstances
  - Covers inter-state behaviour, as well as terrorism and crime
  - Demands national implementation, including national criminalisation and penalisation of international prohibitions
- **Operates tools to enhance transparency, monitor and enforce compliance (incl. verification), and resolve concerns and conflicts**

General characteristics

- **Multilateral → inclusive treaties**
  - Any country can join if it so desires
  - Equal obligations and rights for all parties to the treaty
- **Other issue-specific tools will tend to draw on or reinforce the SITS**
  - UN Secretary-General's investigative mechanism
  - UNSC Resolution 1540 with regard to CBW
  - Australia Group control lists → from plurilateral tool to increasingly accepted standard for national legislation on CBW
  - Ability for adaptation to special circumstances
    - E.g., OPCW-UN Joint Mission for CW elimination in Syria
- **Ability to build functional lateral links to other treaty systems or international organisations**
  - BTWC → FOA, OIE, WHO
  - CWC / OPCW → UN, WHO
  - CWC – BTWC interaction on science and technology conversion

Additional benefits

- **Emerging issue areas become integrated into conventions**
  - Biosecurity & -safety in BTWC + development of lateral functional links (WHO)
  - Chemical security & safety in CWC
    - Helps to build regional dynamics in support of the convention
    - Overcomes politically sensitive issue of prepositioning emergency assistance equipment in certain regions
    - Supports training, capacity-building and other aspects of international cooperation for peaceful purposes
  - Close monitoring of scientific & technological developments
- **One negotiation; single ratification / accession process**
- **Other institutions will draw on the central prohibitions in SITS to develop own specific actions**
  - E.g. Interpol, WCO, professional and academic associations, etc.
  - Widens and deepens multi-level stakeholdership → reinforcement of the core norm against CBW

Scattered approach in NW control

- **No formal prohibition on NW use**
  - Nuclear Weapons Ban (2017) not yet in force
- **Multiple additional initiatives, but no integration:**
  - Bilateral treaties (e.g., SALT, INF, START, ...) between USA – USSR/Russia; Regional nuclear weapon-free zones
  - Plurilateral initiatives, often with informal status (technology transfer arrangements, Global Partnership, nuclear security summits, ...)
  - UNSC resolutions (1540, nuclear terrorism, ...)
  - Unilateral drawndown of nuclear forces, but with modernisation of remaining weapon holdings (mostly in terms of delivery systems)
- **No definition of a NW**
- **Radioactive materials: under nuclear umbrella or not?**

Non-Proliferation Treaty (1968)

- **Principal provisions**
  - Nuclear Weapon States (NWS) shall not transfer NW of NW-related technology to Non-Nuclear Weapon States (NNWS)
  - NNWS commit themselves not to develop or otherwise acquire NW
  - NNWS obtain the right to receive nuclear technology for peaceful purposes
  - External organisation (IAEA) responsible for administering safeguards
- **Gaps from a weapon control perspective**
  - No weapon elimination or limitation
    - Commitment to pursue good-faith negotiations towards disarmament
  - There are 'nuclear-armed states' (i.e. not recognised NWS)
  - No verification of NW programmes in NWS
  - Discriminatory regime between NWS and NNWS

Nuclear Weapons Ban (2017)

- **Principal provisions**
  - Prohibits threat of use and use in armed conflict
  - Complete elimination of NW stockpiles
  - Bans NW development, production, testing, acquisition, stockpiling, transfer and deployment of NW from another state on territory of a state party
  - Conflict resolution framework
  - National implementation requirements
  - Non-discriminatory
- **Gaps from a weapon control perspective**
  - Not yet in force (70 signatories; 23/50 required ratifications as of 1 May 2019)
  - No verification provisions (except for IAEA comprehensive safeguards obligation, including for non-diversion of nuclear materials following weapon destruction)
  - No international implementation organisation foreseen
  - No explicit transfer controls
  - Which are the incentives for NWS and nuclear-armed states to join treaty?
  - Not a SITS

Nature of arms control and disarmament agreements

- **Global (multilateral)**

  Partial Test Ban Treaty (PTBT, 1963), Outer Space Treaty (1967), Non-Proliferation Treaty (NPT, 1968), Seabed Treaty (1971), Biological and Toxin Weapons Convention (BTWC, 1972), Moon and Other Celestial Bodies Agreement (1979), Chemical Weapons Convention (CWC, 1993), *Comprehensive Test Ban Treaty (CTBT, 1996), Mine Ban Convention (1997), *Nuclear Weapons Ban (2017)

- **Regional (multilateral)**

  Antarctic Treaty (1959), Conventional Armed Forces in Europe Treaty (CFE Treaty, 1990), Nuclear Weapon Free Zones: Tlatelolco (1967), Rarotonga (1985), Bangkok (1995), Pelindaba (1996), Semipalatinsk (2006)

- **Bilateral**

  Anti-Ballistic Missile Treaty (ABM Treaty, 1972), Strategic Arms Limitation Treaty I (SALT I, 1972), *Strategic Arms Limitation Treaty II (SALT II, 1979), Intermediate Range Nuclear Forces Treaty (INF Treaty, 1987), Strategic Arms Reduction Treaty I (START I, 1991), Strategic Arms Reduction Treaty II (START II, 1993), Strategic Offensive Reductions Treaty (SORT, 2002), New START (2010)

Part 3

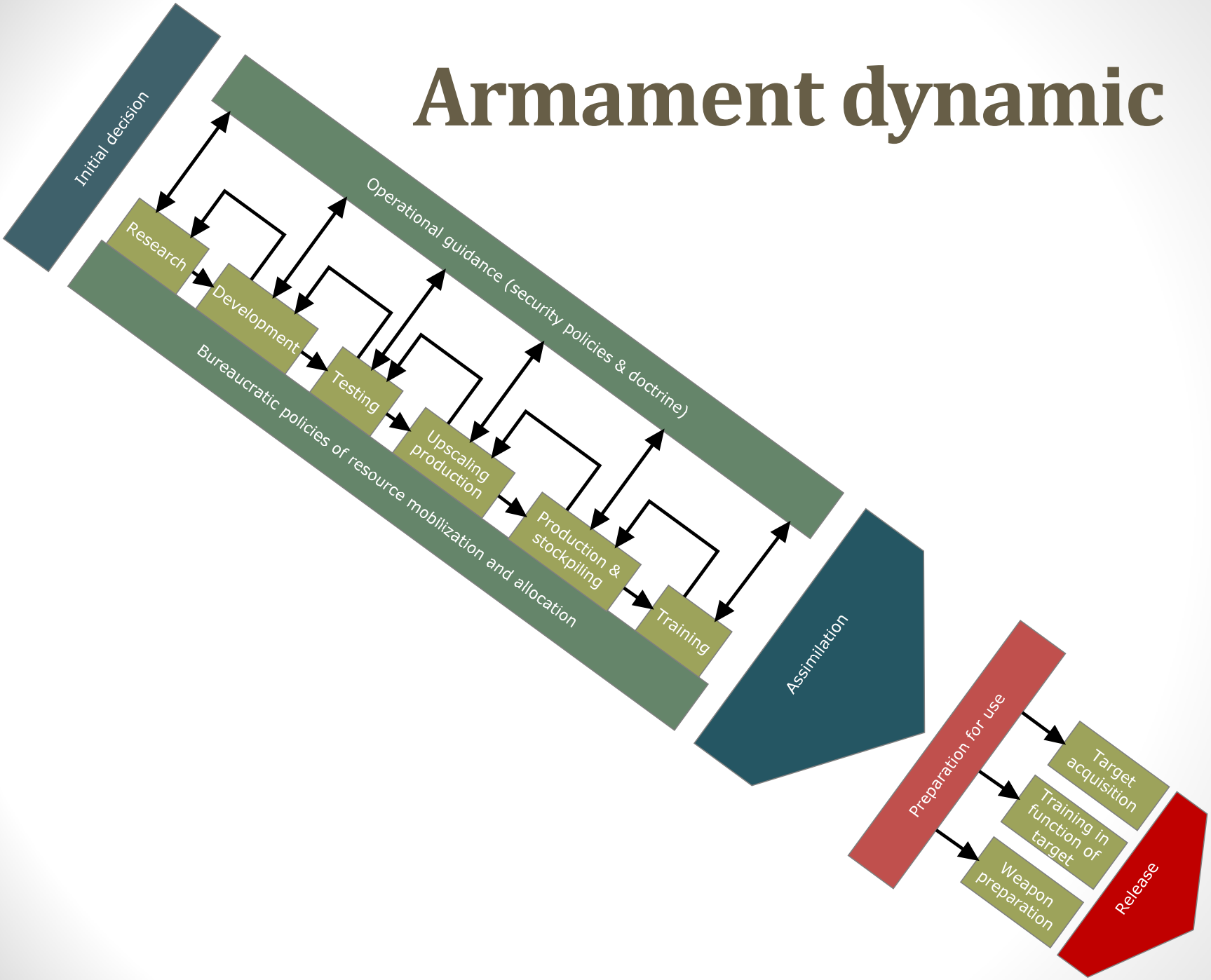
'*ARMAMENT*' AND '*PROLIFERATION*'

Armament versus proliferation

- **Armament:**
  - Quantitative or qualitative enhancement of military capacity
  - Essentially a domestic process
    - Internal process for criminal or terrorist entities

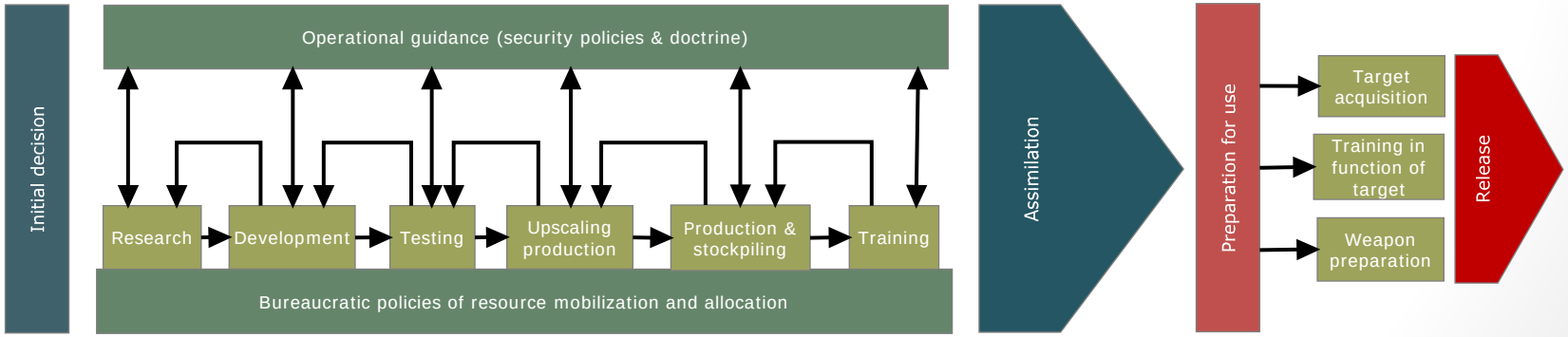
- **Proliferation:**
  - Transfer of technology from a possessor to a non-possessor
    - '***Horizontal proliferation***': lateral spread
    - '***Vertical proliferation***': weapon acquisition and improvement (= armament?)
  - Essentially a trans-national process
    - May be domestic in case of transfers to criminal or terrorist entities
  - Has a ***supply*** and a ***demand*** dimension

Armament dynamic

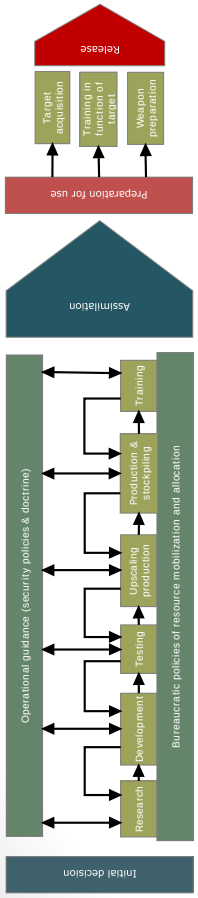


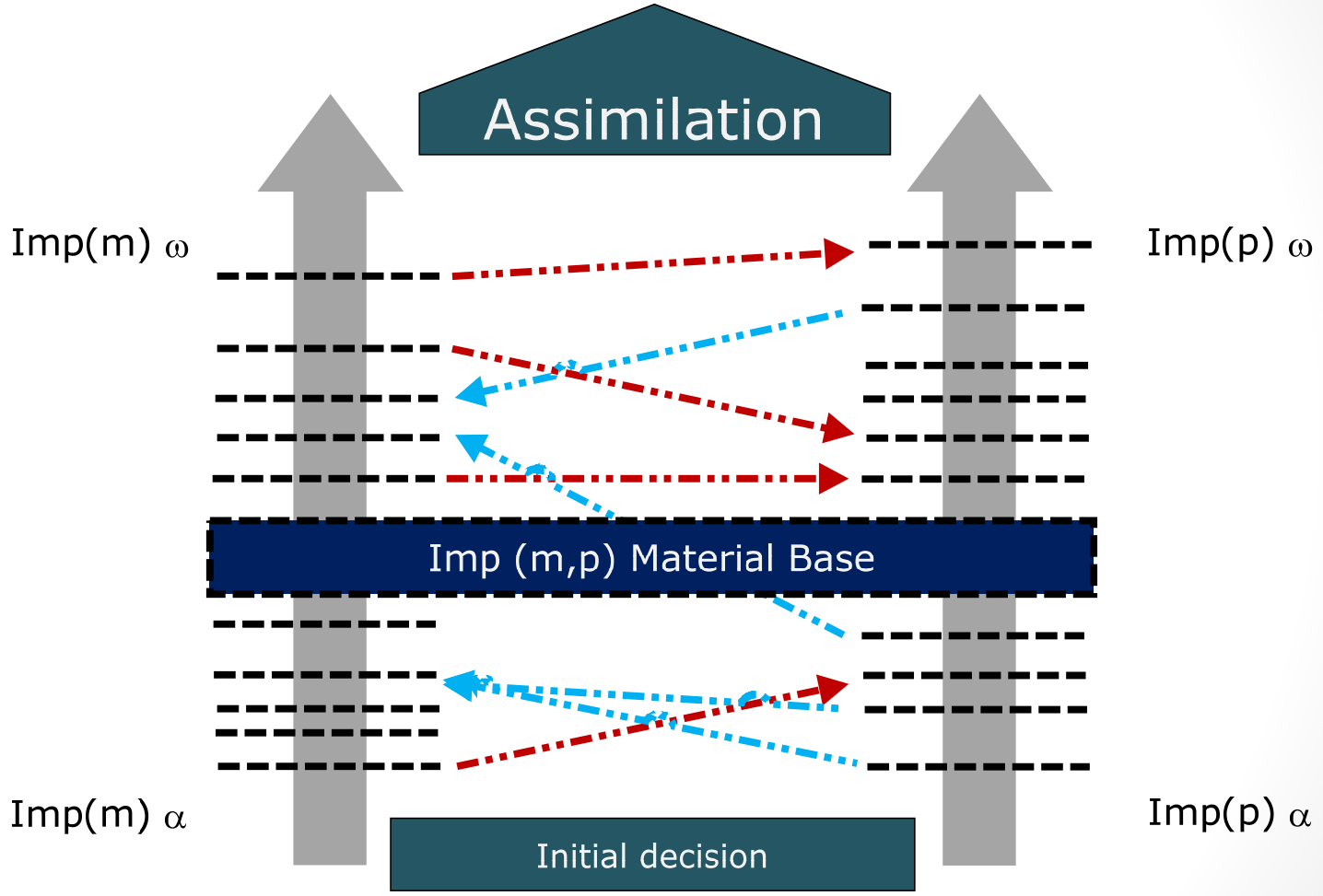
Assimilation

Assimilation is the ***process*** by which for a particular type of weaponry the ***military and political imperatives***, as constrained by the political entity's ***material base***, become ***reconciled*** with each other, so that the weaponry becomes an integral part of ***current mainstream military doctrine***.



Material base





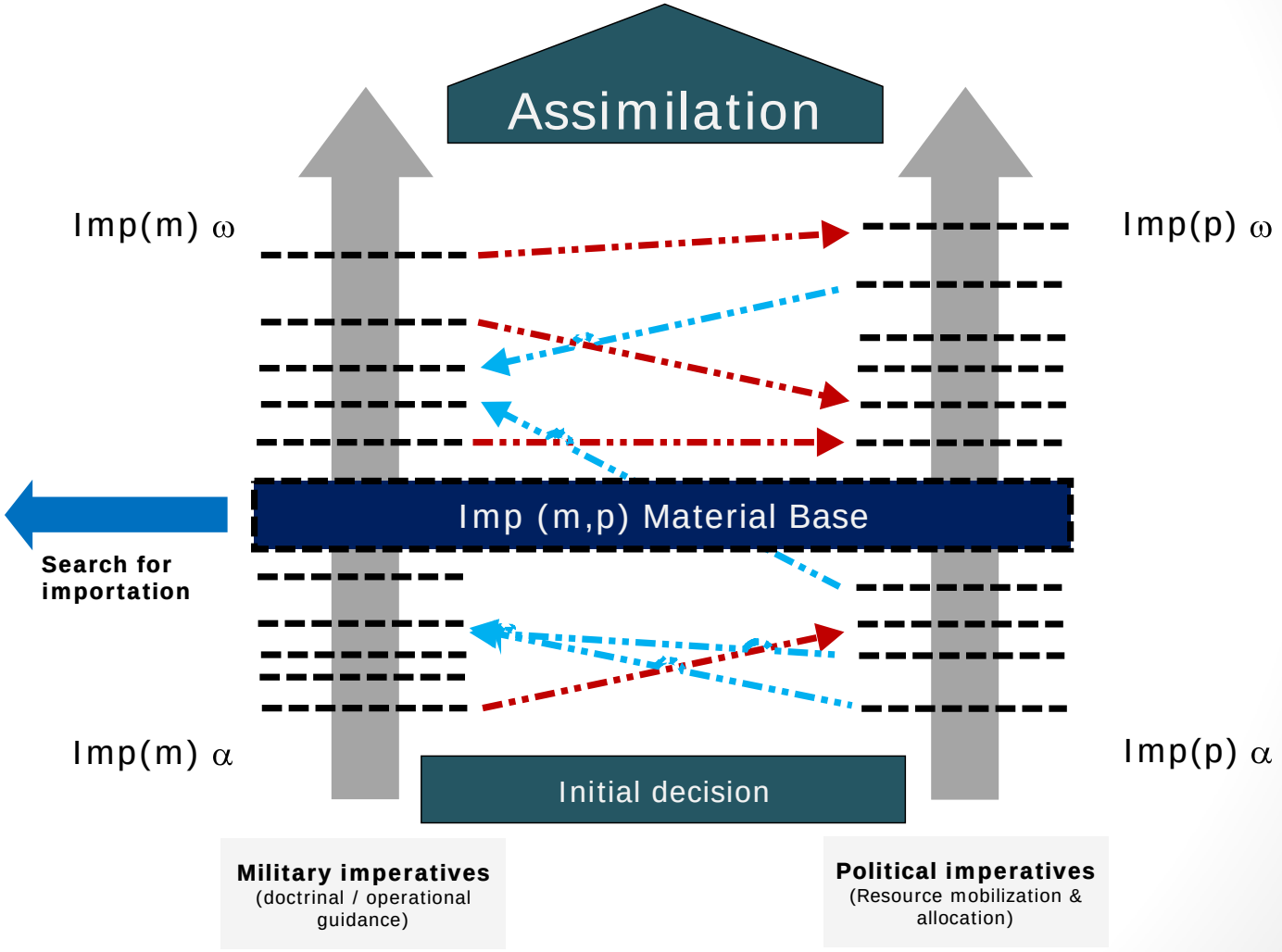
The material base as an enabler or impediment

- **Two major components**
  - ***Physical base*** (essentially unchangeable variables)
    - Geographical location; territorial size
    - Population size
    - Presence of natural resources; easy access to natural resources
  - ***Societal base*** (variables that can be changed over a long period, but armament ≅ urgency)
    - Political culture
    - Level of education
    - Scientific and technological base
    - Industrial development and economic strength
- **Particularly important independent variable as it cuts through both the political and military imperatives tracks**

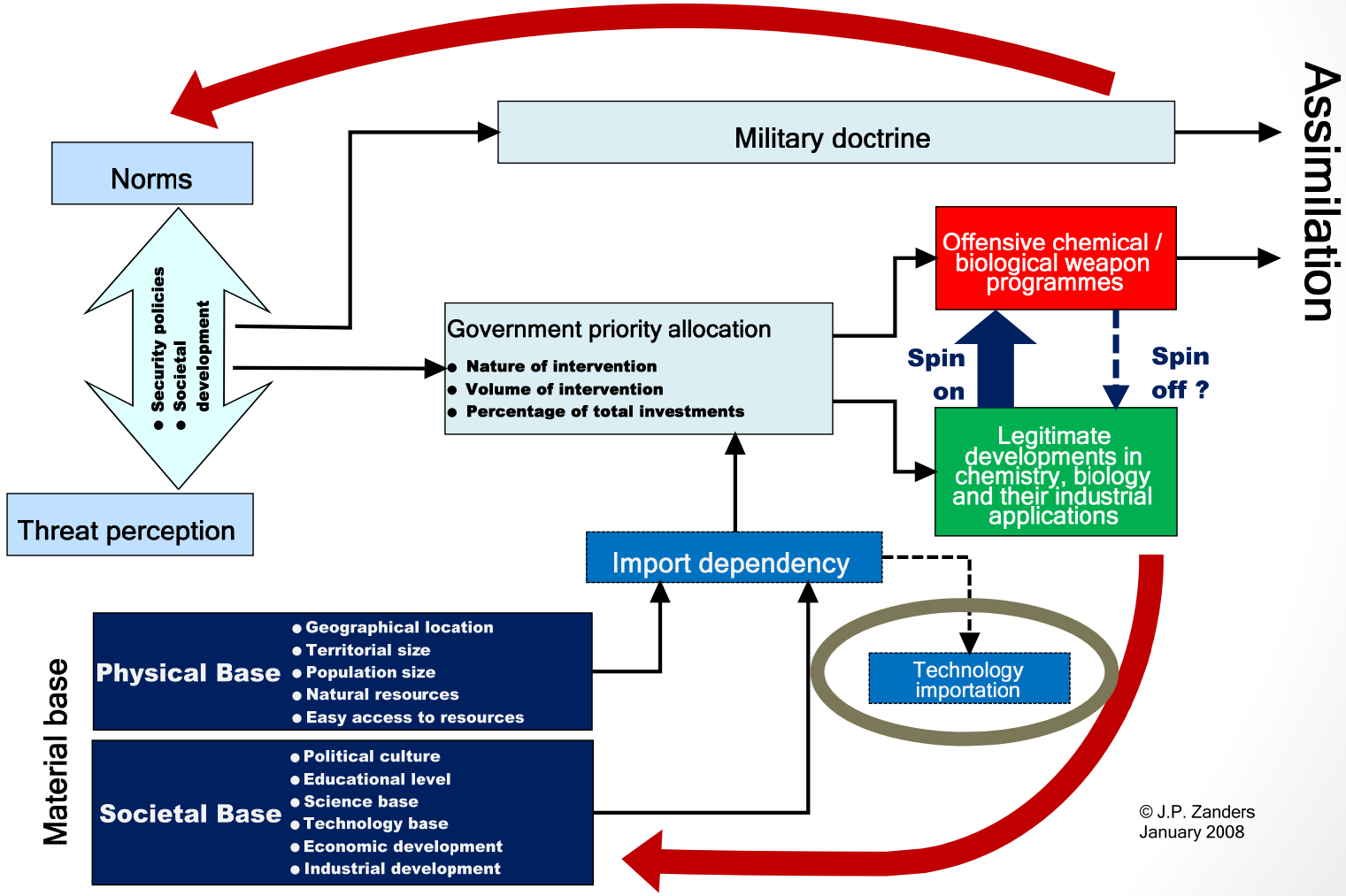
Role of the material base

- **Critical to the demand-side understanding of proliferation**
- **Scarcities of certain resources**
  - Certain natural resources
  - Insufficiently advanced educational base; technical skills
  - Insufficient R&D and industrial base
- **Two basic options:**
  - Develop the missing ingredients indigenously
  - Seek the missing ingredients abroad (legally or illegally)
- **However, what about the physical base; time constraints?**

Demand-side of proliferation



Non-proliferation policies:
Targeting the supply side



Part 4

THE '*DUAL-USE*' CHALLENGE

What is '*technology*'?

'Technology comprises

- the ***ability*** to recognise technology problems,
- the ***ability*** to develop new concepts and tangible solutions to technical problems,
- ***the concepts and tangibles*** developed to solve technical problems, and
- the ***ability*** to exploit the concepts and tangibles in an effective way.'

Errko Autio and Tomi Laamanen, 'Measurement and evaluation of technology transfer: Review of technology transfer mechanisms and indicators', *International Journal of Technology Management*, Vol. 10, Nos. 7/8 (1995)

Tangible and intangible technology

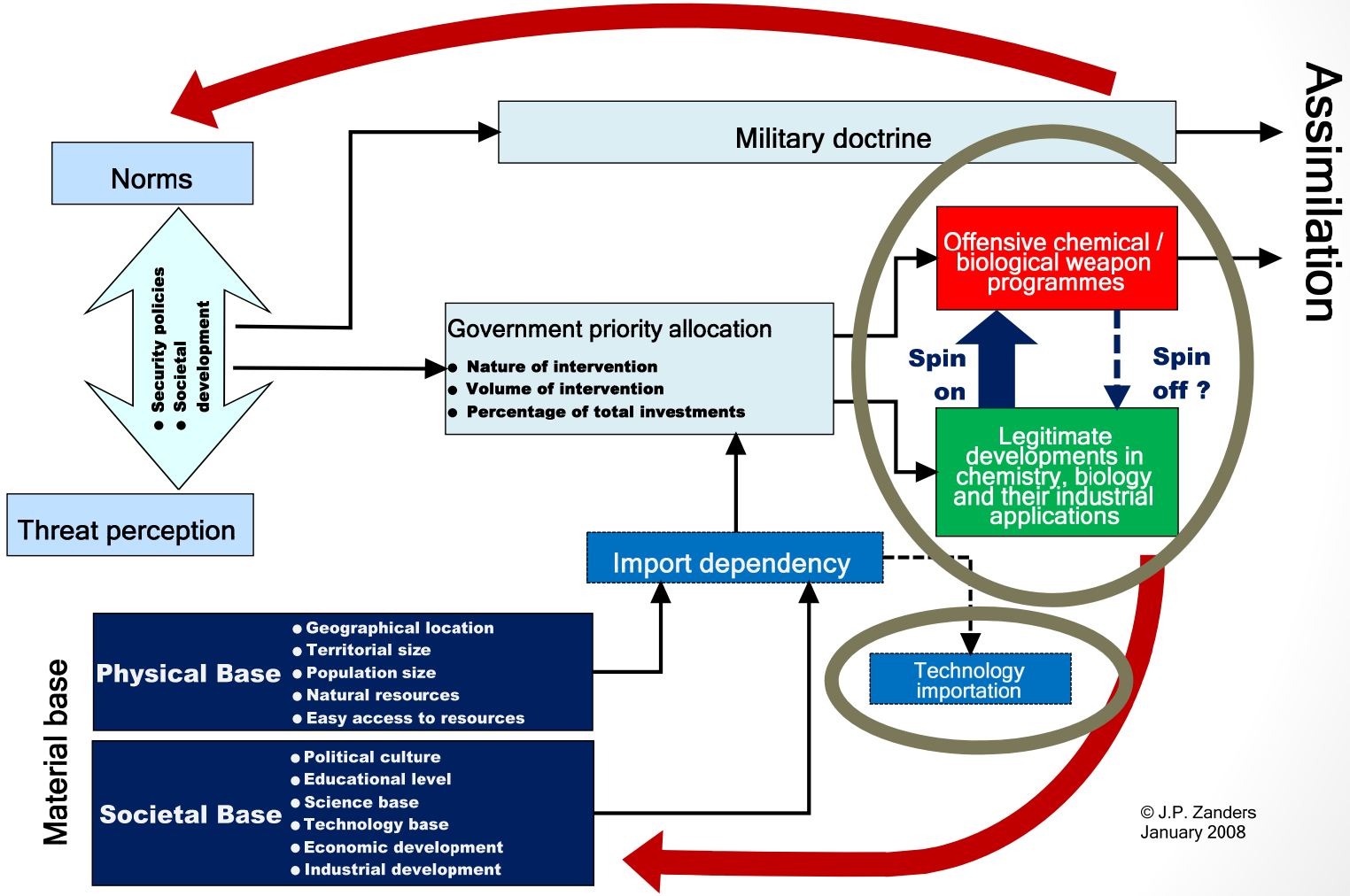
- **Tangible objects or artefacts**
  - Pathogens, chemicals, toxins
  - Laboratory equipment
  - Fermenters, production installations
  - Delivery systems, special equipment
  - Etc.
- **Intangible technologies**
  - Data
  - Processes
  - Knowledge
  - Expertise and skills
  - Etc.
- **Transfer types**
  - Across borders between different economic units
  - Across borders within the same economic unit (e.g., intranet)
  - Between economic units inside state borders

Dual-use technology

- **Dual-use technology:** a technology that has the ***potential*** to be applied for a purpose other than the one for which it was originally intended
  - ***Spin-on***: military application of technology originally intended for civilian purposes
  - ***Spin-off***: civilian application of technology originally intended for military purposes
- **Single-use technology:** a technology that lacks such potential (e.g. the weapon itself)

- **Note:**
  - No trade in CBRN weapons
  - Transfers involve dual-use technologies ***underlying*** CBRN weaponry → ***core of the challenge***

Dual-use challenges in weapon control



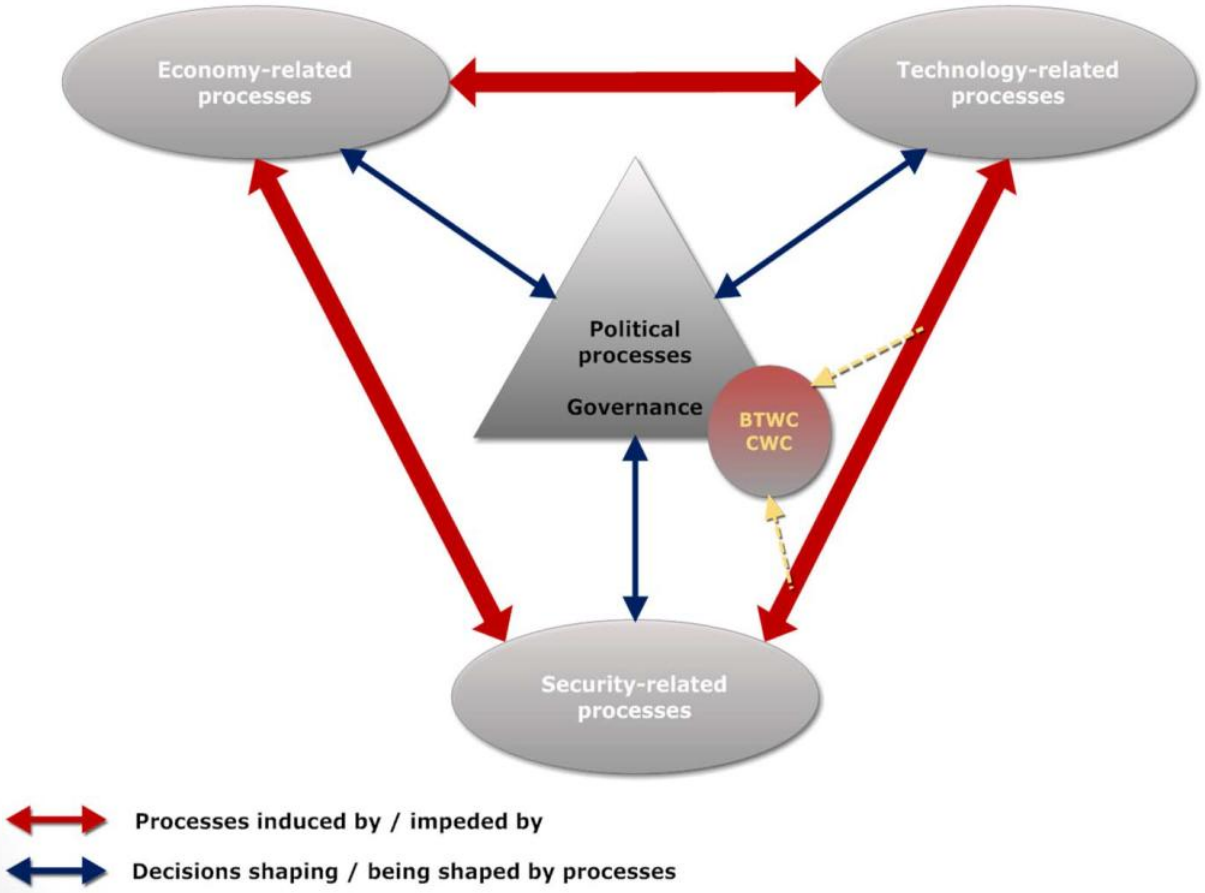
Part 5

WHY TECHNOLOGY TRANSFER CONTROLS ARE IMPORTANT TO YOU …

Entrance of the *post-proliferation era*?

- **Nuclear:**
  - Global warming and growing interest in nuclear energy
  - Commercial pressure to access new markets
    - e.g., US-India & US-UAE bilateral agreement; Saudi Arabia forthcoming
- **Biological:**
  - Biology and biotechnology critical to development & health
  - Many developing countries conduct leading-edge research
  - Education expanding everywhere: spread of knowledge to manipulate pathogens, including genetics
  - Biotechnology is essentially information: no physical goods to cross borders
  - Corporate acquisition and sell-offs
- Chemical:
  - Similar to biological
  - Many production facilities with potential for CW manufacture now located in developing world

BTWC & CWC in a polycentric world



- No unified model for governance of weapon control anymore
- New stakeholders and security actors
- Increased role of non-state national & transnational actors
- Shifting relative balances of powers (economy, politics, military) and multiple power centres
- Geographical decentralisation of business and industry activities
- South-south trade patterns and impact on technology diffusion

- ***Declining role of states in shaping developments, but many states reject formal governance responsibilities for non-state actors under BTWC & CWC***

The Future:
Multi-layered & multi-sectorial governance model?

- **Weapon control**
  - Multilateral agreements (Geneva protocol, BTWC, CWC)
  - Proliferation prevention arrangements (Australia Group, PSI, Global Partnership, etc.)
  - UN agencies: UNSC, UNODA, 1540 Committee, UNEP, UNDA, etc.
  - National laws and regulations (criminal, penal, trade, safety, etc.)
- **Disease prevention**
  - WHO, FAO, OIE + their regional organisations/initiatives
- **Crime and terrorism**
  - UNSC Resolutions (1540, terrorism resolutions, etc.)
  - Interpol, Europol, etc.
- **International transfers**
  - WTO, WCO, etc.
- **Economic actors**
  - Companies (national, multinational, transnational)
  - Research institutions
  - Individuals
- **Instruments of collective & individual governance**
  - Codes of conduct; Professional codes; Ethics
  - Awareness-raising & education
  - Whistle-blower protection schemes

National implementation = key aspect

- **'Any necessary measures'**
  - Wide range of legislative and regulatory tools available
- **Penal legislation**
  - Deterrence and prevention
- **Criminal procedural legislation**
  - Enable investigation and prosecution of CBRN-related crimes
    - Before an incident (→ in the CBW context, incorporation of the ***General Purpose Criterion***)
    - After an incident
- **Transfer controls**
  - Import, transit and export control legislation
  - Legislation governing domestic transfers of materials (terrorism & crime)
  - Legislation must cover all actors involved in the transfer process
- **Authorisation of legitimate activities**
  - Registration and licensing of legal and natural persons and certain types of activity
  - Transport and storage regulations
  - CBRN safety and security policies
    - Government level
    - Company level
    - Individual level

THE TRENCH

Recalling where science, industry and military art converged
Challenging entrenched positions

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