

CBRN Weapons

Security Challenges and Their Control

Dr Jean Pascal Zanders

The Trench

Trade Controls for GUAM Countries

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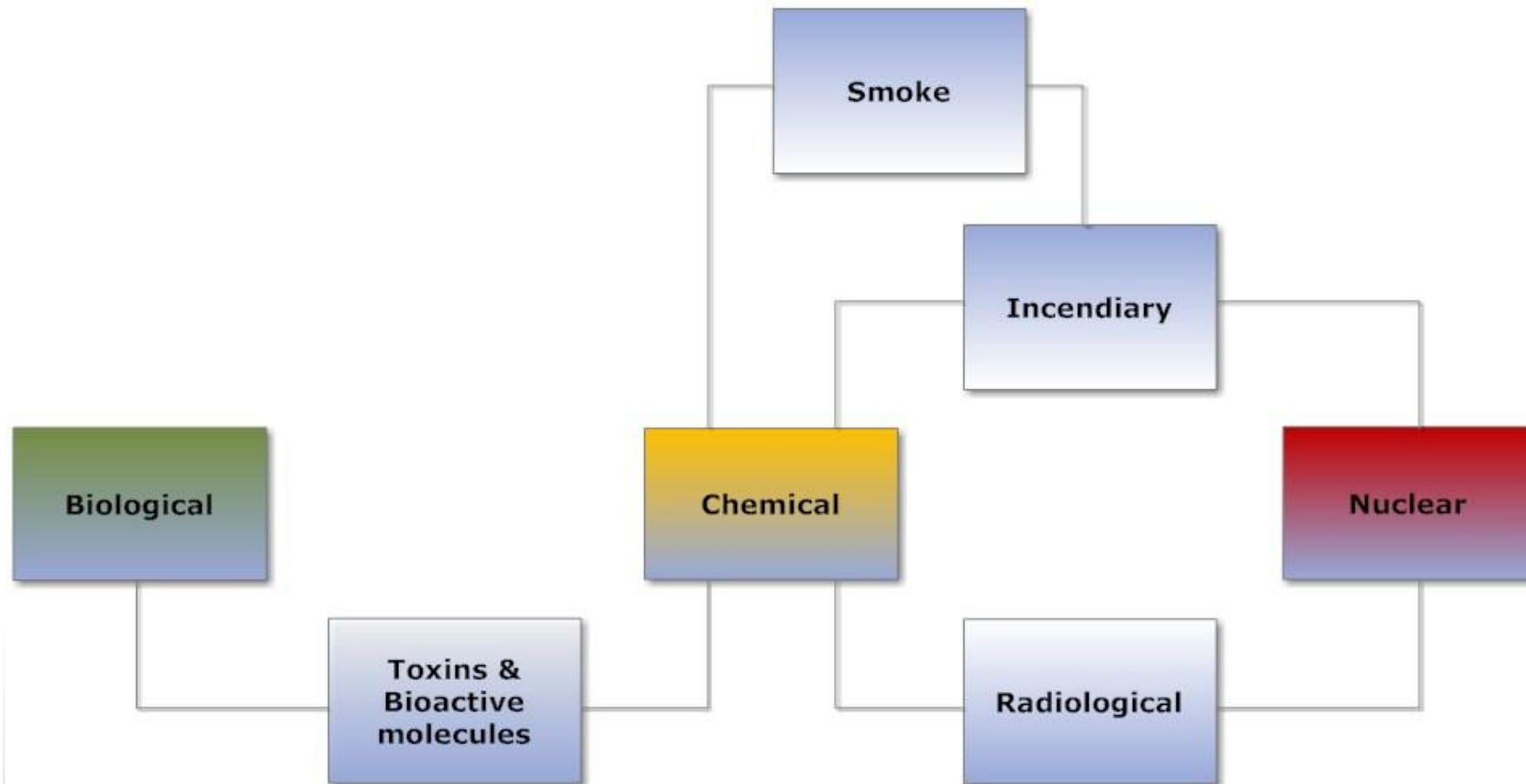
Part 1

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 drawdown 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 or 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)

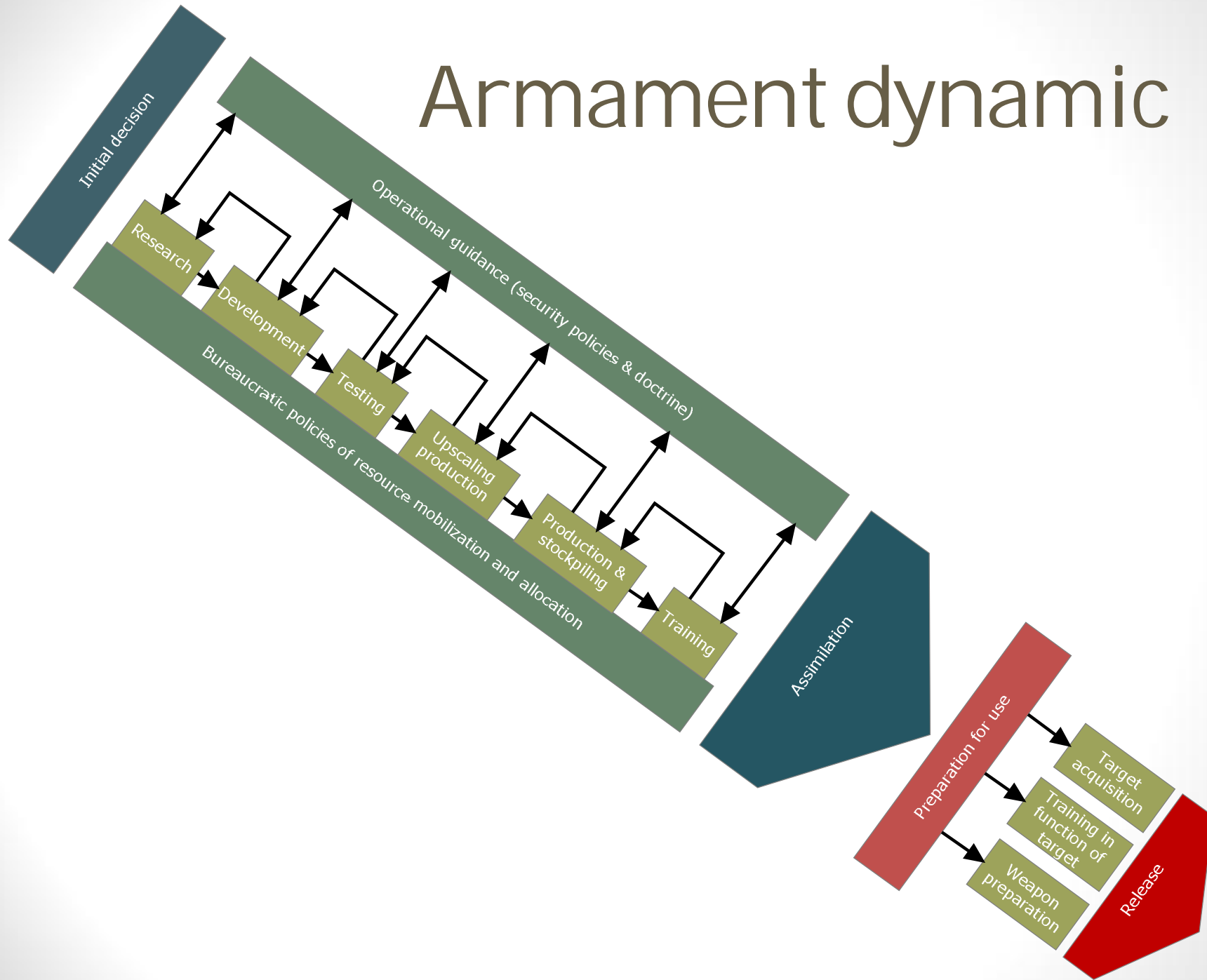
Part 3

'ARMAMENT' AND *'PROLIFERATION'*

Armament versus proliferation

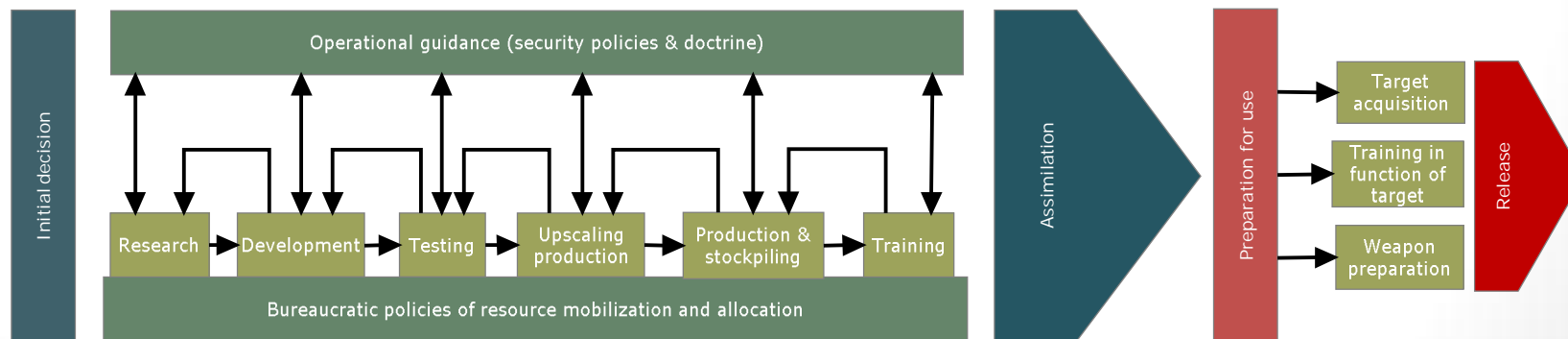
- **Armament:**
 - Quantitative or qualitative enhancement of military capacity
 - Essentially a domestic process
 - Internal process for criminal or terrorist entities
- **Proliferation:**
 - Transfer of technology from a possessor to a non-possessor
 - '*Horizontal proliferation*': lateral spread
 - '*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

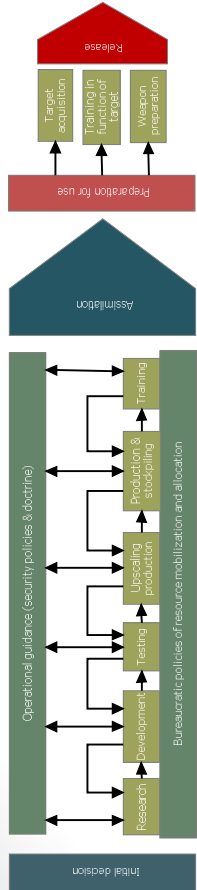
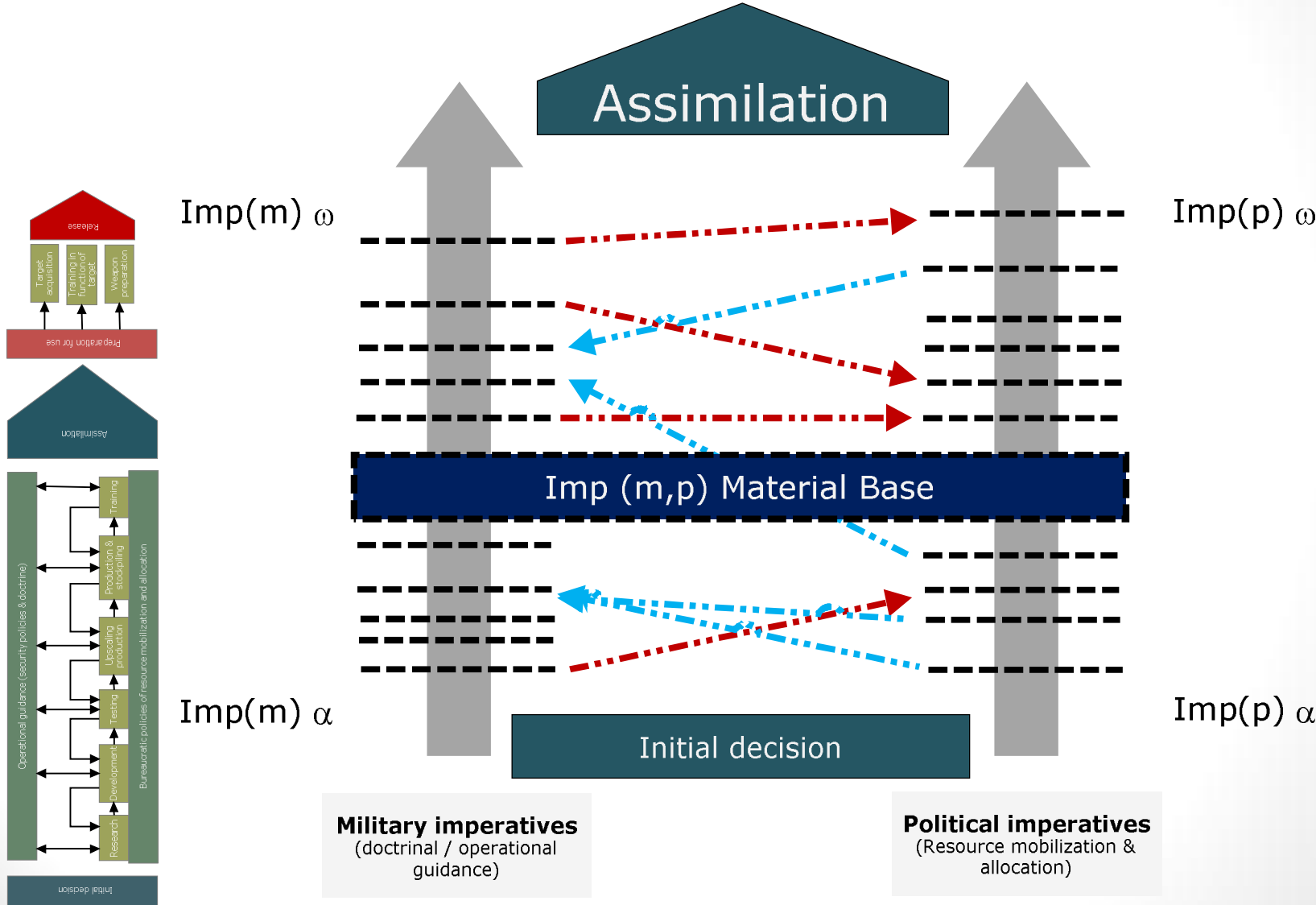


Assimilation

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



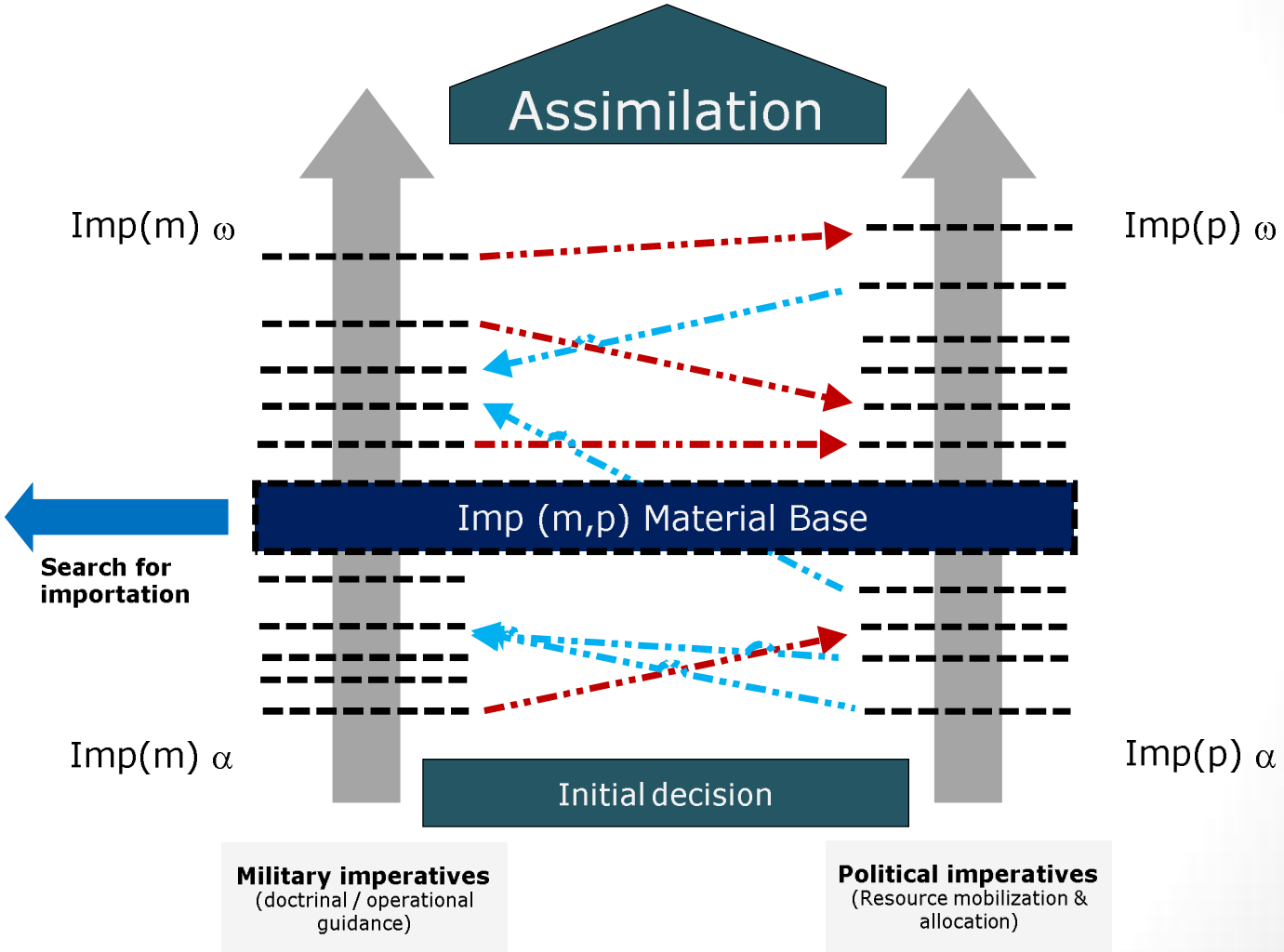
The material base as an enabler or impediment

- 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

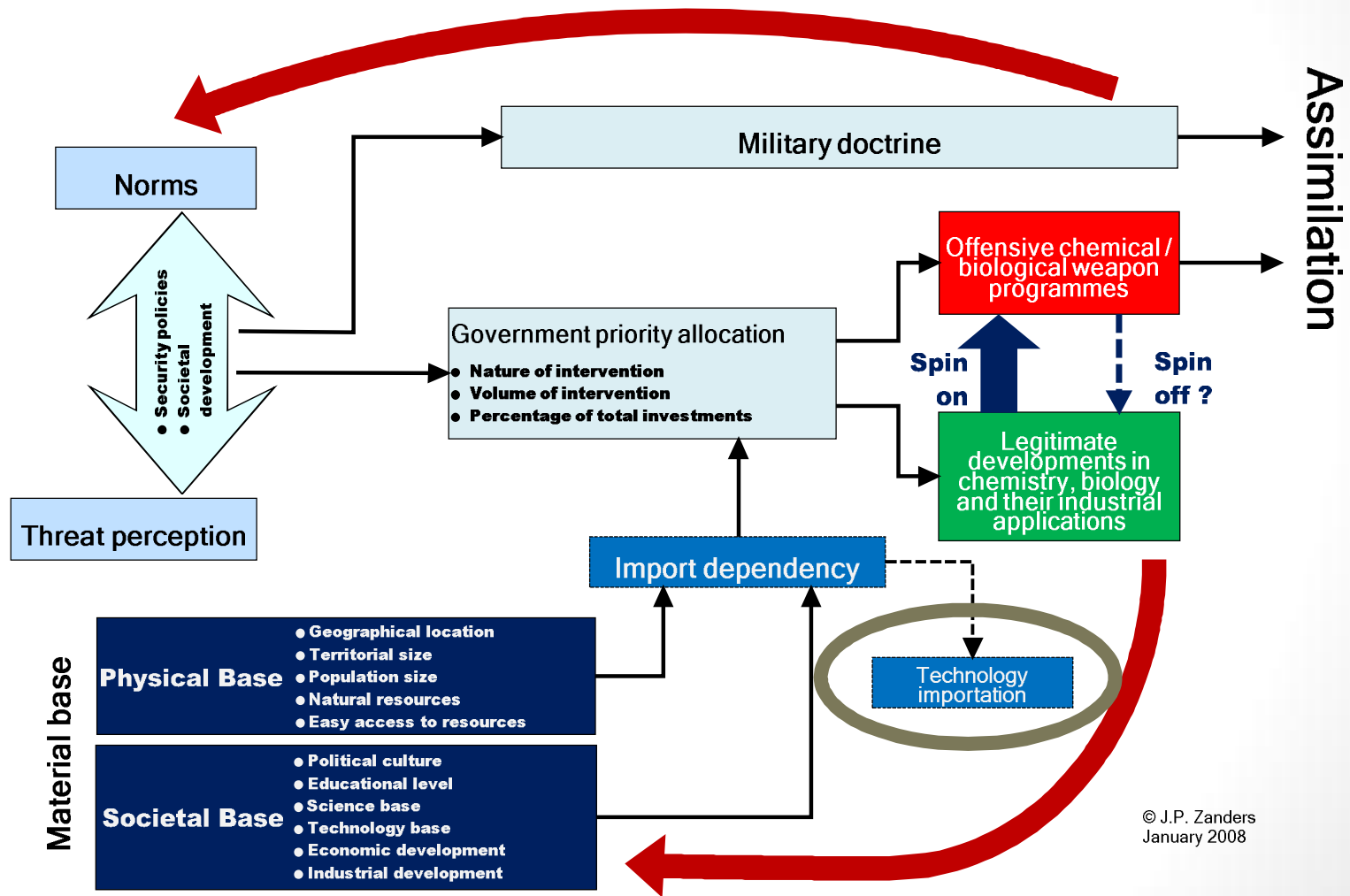
Role of the material base

- 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)

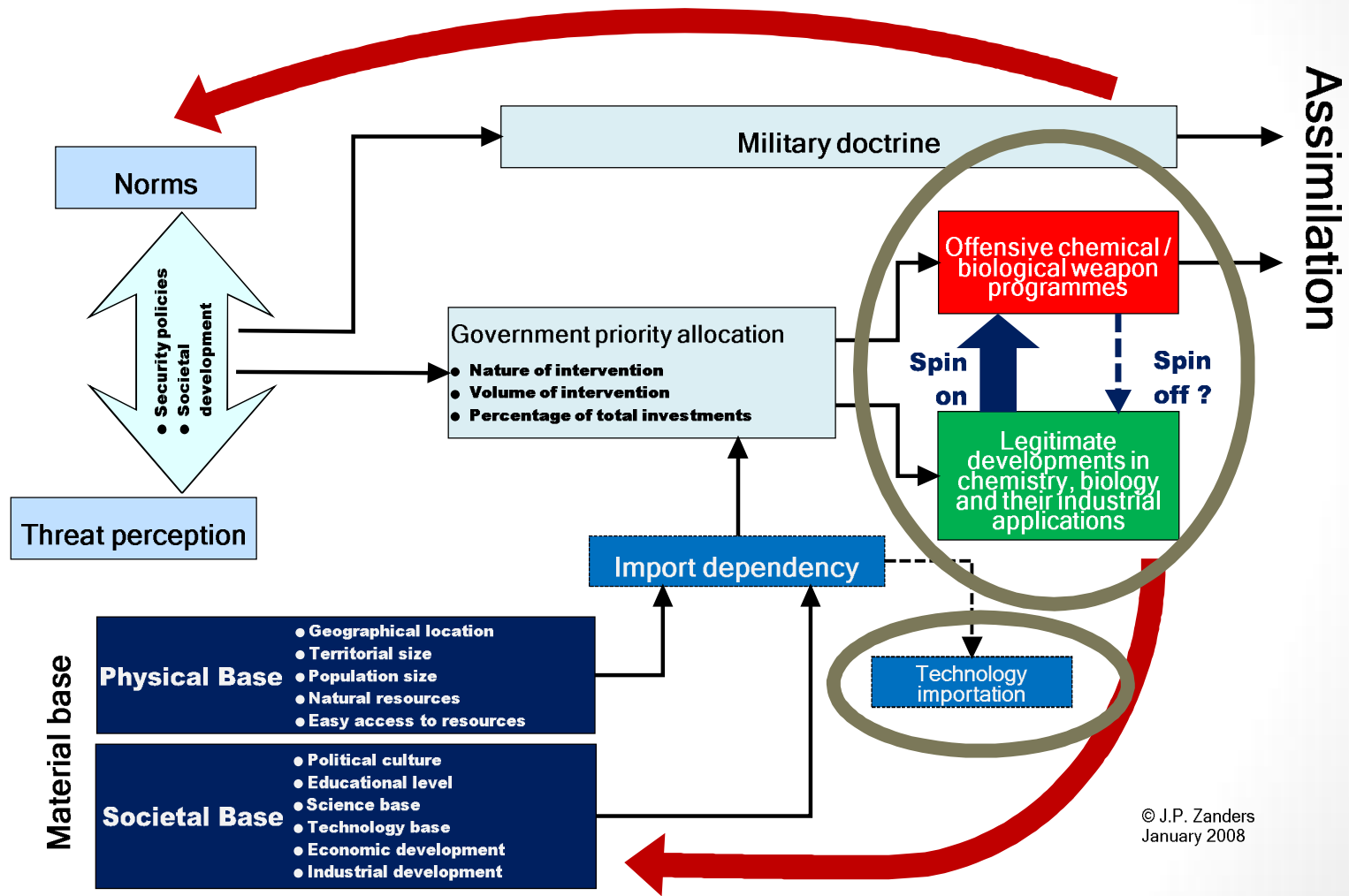
Tangible and intangible technology

- **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



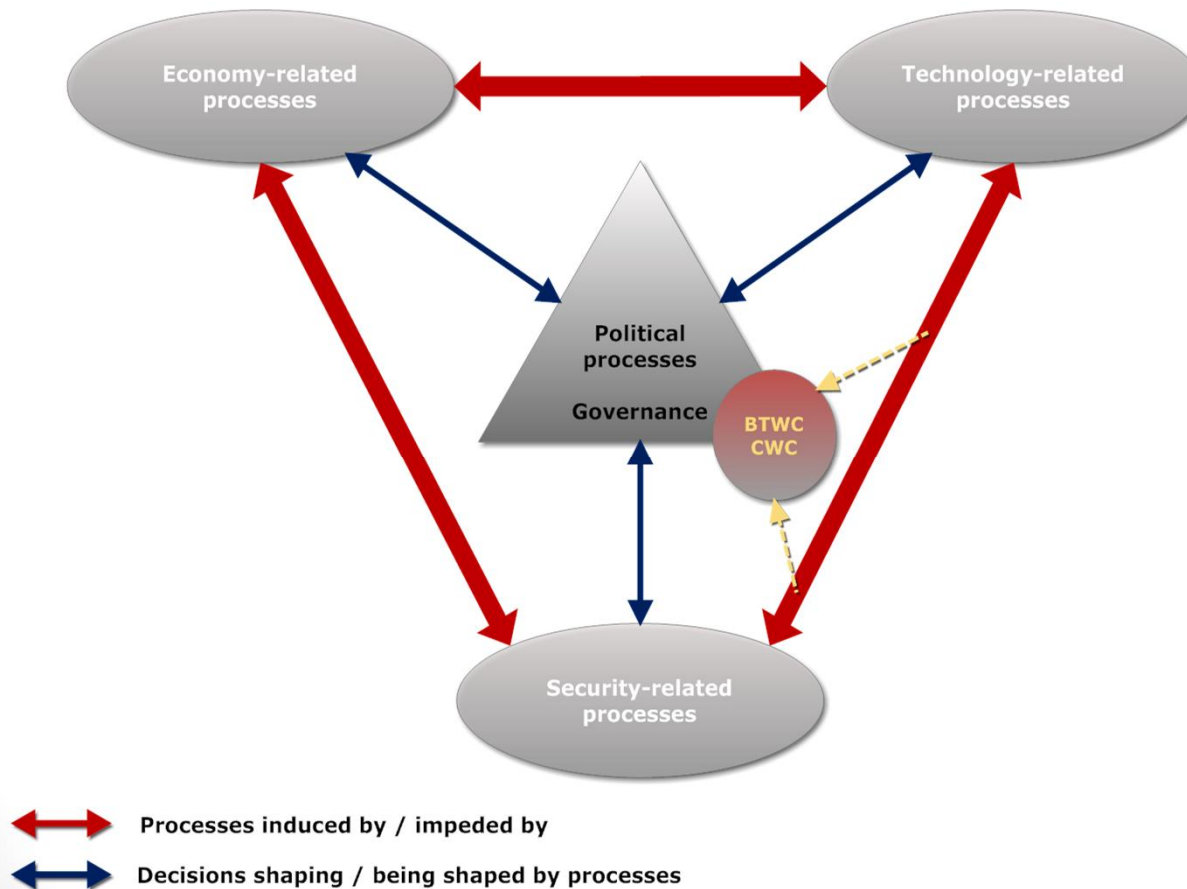
Part 5

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

Education about export controls ...

- Is about changing attitudes of individuals or groups
 - Audiences need to acquire enhanced awareness about the potential implications of their activities and individual actions
 - They must be able to identify and assess short-term and longer-term risks and threats
 - They must acquire situational awareness to maintain standards of responsible behaviour
- Knowledge transfer is insufficient to shape attitudes
 - Audiences need to be engaged
 - They need to discover for themselves *why* the issue area is important / relevant to them
 - They need to discover *how* they can mitigate risks and threats
 - The insights need to become part of the daily professional routine



THE TRENCH

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

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