Strategic Resources in 2030: Three Challenges for the Future of International Security

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Introduction
The world's security landscape is changing rapidly, influenced by geopolitical shifts, new demographic pressures, an increasing disconnect between power centres and communities at the margins, and the speedy expansion of new technologies. This expansion has produced a shift in resources strategic for the global economy and for human wellbeing more broadly. If current trends persist without major external shocks while the Fourth Industrial Revolution is unfolding, by 2030 this shift is likely to yield three challenges for the future of international security. This paper sets out these three challenges, namely (i) catastrophic consequences, (ii) deliberate disruptions, and (iii) extra-physical erosion.

1. Catastrophic Consequences
The first challenge to the future of international security arises from the shift from a carbon-based economy to a post-carbon world, driven by the need for resources to produce new technologies. Natural resources including rare earth elements such as cobalt, lithium, and graphite necessary for the production of batteries and other components of new technologies are in great demand. They challenge the place of oil and gas at the centre of the international community's attention, revealing new vulnerabilities in the international system. This shift towards new strategic resources for the world economy has unintended consequences which can be catastrophic for international security, and thus question the precondition necessary for working towards a more secure world.

Geopolitical dynamics linked to local or regional conflicts as well as external military invasions to either stabilize or change governments are increasingly shaped by the location of new strategic resources. This is likely to shift zones of insecurity. Today, oil in the Middle East informs strategic calculations of international power players. Tomorrow, graphite in China, cobalt in the Democratic Republic of Congo (DRC), or lithium in the shared [triangle of Argentina, Chile, and Bolivia](#) may intensify tensions between states, between states and non-state actors, and among several non-state actors striving for control over territories featuring these minerals.

[Lacking proper due diligence policies](#), the supply chains of such new strategic resources are characterized by child labour and human rights abuses, committed against those involved in illegal mining in the DRC for example, where more than 50 per cent of the world's cobalt supply, and reportedly around 80 per cent of global coltan, stem from. Local communities residing in strategic territories are being displaced, as examples of indigenous communities from the [Chilean Atacama desert attest](#). With external pressure on such territories being on the rise, we are likely to see more forced displacements and abusive practices to incentivize people to give away their property rights or leave their homes altogether. This increases the risk of violent revolt of such people against oppressive or abusive regimes or outside intervenors.

Finally, the environmental damage due to deficient regulation and scrutiny, coupled with demographic pressures, is increasing tensions both locally and globally, as food insecurity due to the contamination of fertile soils for example, may trigger new conflicts.

Taken together, the exploitation of new technologies that enable progress has unintended consequences that may pose a serious risk to international security. The visibility of the shifts towards new, or

consolidation of existing conflict zones across entire regions and continents (e.g. from the Middle East to Africa's Great Lakes region, and South America's Andean region) changes geopolitics considerably, empowering players such as China, while making Western Europe or the US less relevant. The schism between losses of local communities residing in affected territories versus the benefits of those exploiting them produces new grievances, and triggers new conflicts that may have been simmering under the surface over the past decades or so. These "glocal" shifts in grievances and power politics are likely to inform novel identity boundaries between continuing or new haves and have-nots. If not addressed properly, catastrophic consequences of these geopolitical shifts may lead to the collapse of the international security system.

2. Deliberate Disruption
The second challenge to the future of international security linked to novel strategic resources is related to the changes in resources required to sustain organized violence and to inflict harm on societies more generally. These changes are the product of the diffusion of technologies, facilitated by the Fourth Industrial Revolution. Novel strategic resources give rise to a new generation of technologies with huge potential for disruption, similar to improvised explosive devices in its ease of use, but far more effective in its destructive power amidst ambiguity over the perpetrator's identity.

The world is not only multi-polar, but also multi-conceptual. Views on what a better future looks like diverge across the globe, making it risky to assume that everyone would buy into the vision of a shared future developed in the western world. The diffusion of technology enables actors to engage in the deliberate disruption of such a "non-shared" vision of the future, if not of the future itself, constituting a potentially existential threat to our current international system and to the goal of improving it.

"Smart" actors take advantage of technologies to disrupt the international security system. Broadly speaking, there are [three categories of resources](#) necessary to sustain organized violence: first, human resources, i.e. manpower; second, material resources or credit (tangible assets that are used to pay agents of violence and to procure technology of violence); and third, expertise or information, which translates into skill sets need to carry out acts of violence. In the past, large armies were essential to successfully fighting wars. Large numbers of unemployed young men, the "youth bulge", have been cited among the conditions that fuel civil wars. Material resources necessary to build weapons systems and credit to acquire the material necessary for it have been playing increasingly relevant roles for the eruption and sustaining of armed violence as well. Today, and even more so tomorrow, expertise and know-how are critical to fighting wars, possibly reducing the current significance of human and material resources.

New technologies facilitate huge impact with minimal resources, if one has the know-how to use them in the intended way. They enable entities such as small countries with few military capabilities, violent non-state groups with sophisticated networks rather than large numbers of soldiers, and individuals such as hackers, to inflict harm on entire societies. Examples of such usages of new technologies abound. [Swarms of killer robots](#) are not just a horror scenario of the future. [Lethal drones](#) are already being deployed by groups such as so-called Islamic State. Also outside conflict zones, novel technologies can easily turn into deadly weapons while being relatively little resource-intense. Cases in point are laser pointers used to blind pilots and thus potentially causing major flight disruptions.

"Smart" actors may also be the new winners in the global reshuffling of control over strategic resources. Rwandan warlords occupying cobalt mining territory, or [Colombian armed groups](#) controlling [coltan mining regions across the border in Venezuela](#) can position themselves more powerfully thanks to such

lucrative income sources. And oppressive governments across the globe benefit from these finances to cover up human rights abuses; they also use their boosted purchase power to ensure that other nations are silent about such abuses while engaging in trade relationships.

The velocity that characterizes the diffusion of technology not only makes it hard to predict or react to such deliberate disruptions. It also fuels uncertainty among people who no longer feel protected by their governments against such threats. At the same time, it fortifies the governments' suspicion towards their own citizens, who justify increased surveillance and other monitoring practices with the need for control. This undermines the state-society relationship and the mutual trust necessary for it.

3. Extra-physical Erosion
The third challenge for the future of international security that comes along with resource changes is the parasitic behaviour of those who unscrupulously use modern technologies to their own benefit, while ignoring harmful repercussions on human society. The international community's attention focuses on the shift from the influence of licit carbon-based supply chains to the influence of global supply chains of rare earth elements on geo-economic and geopolitical events. Yet in the shadow of these major shifts, some actors quietly expand and consolidate illicit global supply chain networks that slowly pervade the entire state (and non-state) system with the international community hardly noticing it. These supply chains comprise multiple interconnected forms of transnational organized crime, ranging from the illicit drug trade through arms, human, and wildlife trafficking, to financial flows stemming from money laundering essential to all these forms of organized crime. Being increasingly managed and controlled in non-physical space, these illicit supply chains have the potential to erode the international security system from within by penetrating its structures without triggering violent conflict that would alert the system's defenders.

These illicit supply chain networks are operated in physical and non-physical spaces concurrently, with the latter gaining traction. The role of way stations along trafficking routes have changed, with violent entrepreneurs increasingly drawing on "online warehouses" rather than physical spaces, and transactions being carried out over the dark web, rather than in physical marketplaces. This not only impedes law enforcement measures against these operations, it also conceals the magnitude of the global illicit economy which is estimated to easily exceed USD 650 billion.

If in the "upperworld", novel technologies have shrunk geography by making the world more connected, in the "underworld" they have allowed illegal actors to sideline geography entirely. Services like Tor for example do not exist in any particular physical location and yet enable transactions across the globe. As a side-effect of the ability of decentralized networked actors to circumvent laws and regulations, these actors can enhance their comparative advantage of being flexible and resilient to external shocks even more in the non-physical space, while those abiding by the rules are likely to increasingly lag behind.

The complexity of these illicit operations makes them less noticeable to the international community than large geopolitical shocks, but in no way less significant. From the corruption of state officials and others due to the lack of control mechanisms to the alienation of communities from central states as a result, the possibility of making use of resources to shift operations to the cyberspace has repercussions on the international system.
Conclusion
New strategic resources facilitate major technological developments conducive to more secure lives and to enhancing wellbeing. Yet they also come along with challenges to the international security system,

most noticeably (i) catastrophic consequences as unintended repercussions of geostrategic shifts; (ii) deliberate disruption by those actors who have a different vision of the international community's future, and (iii) extra-physical erosion of the international security system by those who use technologies to further private goals while ignoring the repercussions on others. Therefore, and if the future of international security is to be shaped in a way that benefits the majority of people internationally, the international community needs to be prepared and plan ahead now to adequately anticipate, and address these three challenges

	1. Catastrophic Consequences	2. Deliberate Disruption	3. Extra-physical Erosion
Change produced by 4IR	From carbon-based to post-carbon economy	From human capital over material resources to expertise/information as major resource required to sustain organized violence.	From resource-intense operations based on territorial control to shifting management and control functions to non-physical spaces
Impact on mission to improve the state of the world	Tensions in new geographic locations question international security as precondition for success.	Those who do not share the same vision of the future use new strategic resources to deliberately attack it.	The parasitic use of new strategic resources in extra-physical space erodes the system of international security from within.
Main vulnerability	System collapse through failure	Deliberate undermining of the system	Erosion of the system from within
Security impacts	- Conflicts over access yield new tensions (while former conflicts lose attention): intensification of conflict in DRC, new conflicts in South America, concentration of power in China - Potential surprises: African/Latin American governments successful in natural resource management may become more powerful players - New targets for external interventions - Human rights abuses in upstream supply chain stages - Conflict through displacement of local, communities, insufficient compensation - Environmental degradation and food insecurity in new locations	- Enhanced disruption capabilities through diffusion of technology, facilitated by new strategic resources - Large armies, youth bulge and military capabilities lose significance, - "smart actors" are on the rise: threats emanate from individuals, violent non-state groups, and small countries - Actors use profit from controlling new strategic resources to sustain violence	- Illicit supply chains in extra-physical spaces go unnoticed, can expand and deepen - Manipulation of 4IR to the benefit of individuals rather than for everyone l - Norms and mechanisms become irrelevant due to side-lining of system
Main feature	Visibility	Velocity	Complexity