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Strategic Security Analysis

Policy and Technology for the Greater Good: Imagining Futures

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Key Points

- It is now commonplace to refer to new technologies as both transformative and disruptive forces.
- Society must be made aware of both the positive impact of emerging technologies and their dual-use nature. An inclusive and transparent dialogue should take place to holistically consider the influence of these technologies on human and international security, taking into account multiple foreseeable scenarios.
- A paradigm shift will require inclusive partnerships, collaborative governance and policy solutions that are fit for purpose.
- A new humanist agenda, shaped by frontier technologies, should be designed to ensure the protection of our fundamental rights and dignity and provide the basis for all the world's people to thrive.

About the Author

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Introduction

Technological developments are occurring at an amazing speed, disrupting our lives in ways that we are only beginning to comprehend. By the same token, existing policy and governance frameworks are becoming less able to manage or control what we call *emerging technologies*.

In parallel, humankind has reached a tipping point where we contemplate our future with a mixture of both hope and uncertainty. It is safe to say that the existential threats humankind is facing are being taken much more seriously since the outbreak of the COVID-19 pandemic, when the whole planet almost came to a stop.

In January 2021 the World Economic Forum (WEF) published its annual *Global Risks Report* for 2021, which contained an index of the greatest threats the world would face in the next 12 months. Unsurprisingly, one of the most significant changes in the ranking of threats between this year and the previous one was caused by the coronavirus pandemic. Categorised in terms of impact, *the risk posed by infectious diseases was ranked in first place in this index*, while in 2020 it was in tenth place.[1] "The immediate human and economic costs of COVID-19 are severe", the WEF's says. "They threaten to scale back years of progress on reducing global poverty and inequality, and further damage social cohesion and global cooperation."[2]

Existing policy and governance frameworks are becoming less able to manage or control what we call *emerging technologies*.

This panorama underpins the current reflection around our collective values and priorities, and underlines the urgency of the need to tackle challenges that can be "seen". As we have already experienced, technological and scientific advances in general are important tools for addressing not only present, but future predicaments facing the human race.

As an example, the rapid and unparalleled development of the SARS-CoV-2 vaccines was made possible by pioneer artificial intelligence (AI)[3] and genetic-related technology.[4] These vaccines are currently saving millions of lives and expediting a global economic recovery.

This Strategic Security Analysis (SSA) presents a non-exhaustive overview of commonly referenced technological developments, namely AI, big data, quantum computing and neurotechnologies. Based on this overview, the concepts of human security, partnerships, collaborative governance and foresight planning are considered in light of these technological advances, and recommendations are made for future-proof policy frameworks that will be needed to deal with the effects of these advances.

Human security and technological advances

The United Nations defines the "human security" approach as one that can "assist Member States in identifying and addressing widespread and cross-cutting challenges to the survival, livelihood and dignity of their people". This approach calls for "people-centred, comprehensive, context-specific and prevention-oriented responses that strengthen the protection and empowerment of all people and all communities". It recognises the linkages among peace, development and human rights.[5]

It is undeniable that new technologies are at the forefront of rapid and wide-ranging societal transformation. Unpacking some elements of a sample of these technologies may help us to imagine technological paths and policy responses that are *good* for humanity.

While acknowledging that "good" is an elusive concept and can be interpreted differently by different stakeholders, in this SSA the word *good* refers to a human-centred approach in terms of which human rights, human dignity and humanity's potential are protected.

Emerging technologies in the area of AI are and will be used for military and security purposes, including the development of autonomous weapons systems (AWSs) and more sophisticated surveillance devices.

1. Artificial intelligence

In a nutshell, artificial intelligence (AI) aims to build machines that will behave in ways associated with human activity, e.g. perceiving and analysing the environment, taking decisions, communicating, and learning. The most common approach to achieving this is through machine learning.[6] The goal of many developers is to embed AI systems in machines that operate dynamically within the human environment.[7]

In the short run, the expansive use of AI-enabled healthcare robots is envisioned (as deployed in some countries during the peak of the COVID-19 pandemic), as well as autonomous vehicles and industrial robots that reduce the need for human intervention.[8] In a decade the exponential growth of AI knowledge will increase the opportunities for human-machine interactions, including the augmentation of human capabilities through AI. In a relatively longer horizon it is expected that brain implants coupled to AI systems will accelerate the development of brain-machine interfaces, and neuroscience discoveries will give new insights into human consciousness.[9]

Generally speaking, in this scenario we could expect frontier AI technologies to be developed that allow us to become more adaptable and resilient in the face of climate-related phenomena by mitigating the effects of global warming, assisting our efforts to ensure food security, enhancing healthcare systems, and giving us innovative tools for combating chronic and other diseases, to name only a few possibilities.

At the same time, emerging technologies in the area of AI are and will be used for military and security purposes, including the development of autonomous weapons systems (AWSs) and more sophisticated surveillance devices (e.g. biometrics).

One characteristic of AWSs is that they will select and apply force to targets without human intervention. According to the International Committee of the Red Cross, after initial activation or launch by a person, an AWS self-initiates or triggers a strike in response to information from the environment received through sensors, and on the basis of a generalised "target profile" previously defined by algorithm programming. This means that the human operator does not choose or know the

specific target(s), the precise timing of the engagement, and/or location of the resulting application(s) of force. The deployment and use of these AWSs pose multiple questions regarding accountability, responsibility, predictability, reliability, and transparency issues, among others. This loss of human control and judgement in the use of force and weapons raises serious humanitarian, legal, and ethical concerns.[10]

More specifically, these systems must be considered through a human security lens, and further understandings will need to be developed to reconcile these fundamental concerns with arguments based on the concepts of military necessity and national security. Some of these conversations are taking place in the context of the UN Convention on Certain Conventional Weapons.[11] However, states with interests in advanced military capabilities have limited open debate on the issue and hindered substantive progress.

We live in an age of readily available, easy-to-abuse and difficult-to-detect digital surveillance tools.[12]

Furthermore, we live in an age of readily available, easy-to-abuse and difficult-to-detect digital surveillance tools.[12] In 2013 the UN Special Rapporteur on the Promotion and Protection of the Right to Freedom of Opinion and Expression noted that weak regulatory environments had provided fertile ground for arbitrary and unlawful infringements of the rights to privacy and freedom of opinion and expression.[13] Subsequently the UN High Commissioner for Human Rights stated that practices in many states involved a lack of adequate national legislation and/or enforcement, weak procedural safeguards and ineffective oversight, contributing to a lack of accountability for unlawful digital surveillance.[14]

In other words, the unique character of AI-based data-driven techniques inherent to AWSs, surveillance tools, and other technologies enabling machine autonomy requires a serious consideration of the human element on both sides of the spectrum, i.e. developers, deployers, and users of the technology, on the one hand, and those against whom it is used, on the other.

2. Big data

Big data analytics is the process of uncovering and identifying trends, patterns, and correlations in large amounts of raw data to help people make data-informed decisions. This field is rapidly evolving, as data engineers look for ways to integrate the vast amounts of complex information created by sensors, networks, transactions, smart devices, Internet use and more.[15] Some of these big data analysis methods include data mining, predictive analytics and deep learning.

By way of illustration, AI relying on big data analytics supported the rapid development of COVID-19 vaccines and helped to predict the spread of the disease by allowing healthcare information to be processed much more rapidly than in the past.[16]

Nevertheless, making use of healthcare data raises questions of cyber security and the privacy of information. Additionally, the issues of governance, ownership and responsibility for overseeing the management of big data are becoming a common concern among healthcare institutions. In many cases these organisations lack adequate systems and databases, and the skilled professionals to handle them.

The major and most influential actors in the realm of big data are tech companies. This reality brings another set of fundamental questions, ranging from the right to privacy and ownership of data to issues of global governance, geopolitics, and geo-economics.

States have been the primary actors in global affairs for nearly four hundred years. This is starting to change as a handful of large technology companies are increasingly rivalling states for geopolitical influence. The Cambridge Analytica scandal and the 6 January 2021 riot at the US Capitol showed that Amazon, Apple, Facebook/Meta, Google, and Twitter are not merely large companies, but have taken control of aspects of society, the economy, and national security that were long the exclusive preserve of the state. The same applies to Chinese technology companies such as Alibaba, ByteDance and Tencent.[17] These companies' digital platforms have penetrated our daily lives so extensively that it has become very difficult for governments and individuals to control and limit their reach.

As convenient as their services are, the emergence of such dominant corporations should ring alarm bells – not just because they hold so much economic power, but also because they wield so much control over political (mis)communication and are able to so widely and rapidly spread hate speech, misinformation, fake news, etc.[18]

Although these technologies are still under development, they already pose challenges, e.g. it is anticipated that future quantum computers will be able to easily bypass most of the encryption techniques currently used to secure communications and data.[20]

3. Quantum technologies

The unique properties of quantum systems allow their use in inferable secure cryptographic key exchange. Organisations such as healthcare providers, governments and financial institutions highly value this capability.[19]

Although these technologies are still under development, they already pose challenges, e.g. it is anticipated that future quantum computers will be able to easily bypass most of the encryption techniques currently used to secure communications and data.[20] Thus, in the foreseeable future quantum communication, computing, and biology will present as yet unfathomable opportunities and risks.

In a short period of time it is expected that commercial quantum cryptographic channels will be established, new quantum algorithms will accelerate hardware development and quantum imaging will improve medical diagnostics. In a longer timeframe, quantum detectors will be able to monitor earthquakes and nuclear tests. Quantum processors will be used in real world applications such as GPS satellites or the safety systems of autonomous vehicles, and investigations of the quantum properties of atoms and isotopes might uncover mechanisms for interaction with biological processes for medical applications.[21]

Conversely, advanced quantum information technologies may affect some of the most important national security tools and tasks, such as intelligence collection, solution optimisation, encryption, stealth technology, and communications. Indeed, the diversity of quantum applications across the national security domain warrants immediate concern, both for how quantum systems are harnessed and how they could undermine state security. Government leaders should prepare for these future scenarios and take the necessary measures to manage their impact.[22]

4. Neurotechnology

Neurotechnology is in essence the attempt to connect human brains to machines, computers and mobile phones. Although brain-computer interfaces lie at the heart of neurotechnology, it can be more broadly defined as technology able to collect, interpret, infer or modify information generated by any part of the human nervous system. This

technology could be key in developing therapies for mental illnesses and neurological diseases, and could soon be used in education, gaming, entertainment, transportation, and so much more.

However, no widely accepted regulations or safeguards are in place to manage the development or deployment of neurotechnology. Moreover, its various forms of application should consider potential consequences for the autonomy, privacy, responsibility, consent, integrity and dignity of the individual. Ethical concerns increase when we are not just monitoring someone's neurodata, but also interpreting it and decoding the person's thoughts, which has implications for assessing the accuracy of the data obtained and the mental privacy of the individual concerned.[23] Other applications would be designed for "human enhancement", which means improving on and overcoming various limitations of the human body and mind, which would have its own regulatory implications.[24]

Rapid advances and convergence in fields such as robotics, information technology, and AI will continue to have a revolutionary impact on the battlefield of the future, bringing increased risks for technology repurposing and horizontal proliferation.[25] The disruptions associated with these technologies will be experienced by the human combatant involved in a conflict, with increasing cognitive demands associated with the employment and use of new capabilities.

Research goals involving biological manipulation will need to be shaped by moral, legal, and ethical considerations and evolving concepts of what it means to be human.

New research priorities may include a focus on the augmented performance of human-machine teams, enhanced cognitive and immunological resilience based on neurobiology findings, and psychophysiological stress tolerance developed in realistic but safe synthetic training environments.[26] Resolving these challenges will require the establishment of interdisciplinary research teams that have the capacity to work across the physical, digital, and biological boundaries while collaborating seamlessly with end users and – in the case of warfare-related neurotechnologies – human combatants. Research goals involving biological manipulation will need to be shaped by moral, legal, and ethical considerations and evolving concepts of what it means to be human.

Partnerships and collaboration

Innovation needs to be encouraged to find solutions to our present conundrums. Investment in science and research capacities is the means to be better prepared to confront current and emerging global challenges, as exemplified by the lessons learned from the COVID-19 pandemic. With this objective in mind, cross-sector partnerships should be developed, creating an enabling environment for both multidisciplinary collaboration and international cooperation.

Governments and other funding institutions must create the incentives to develop these partnerships, e.g. by giving polymath research teams access to grants, contracts and R&D resources, while external advisory or steering committees should be mandated for key government initiatives. Similarly, ad-hoc task forces and other collaborative mechanisms are plausible means to work together across organisational boundaries.

Two decades into the 21st century the issue of whether humans should transcend their current natural state and limitations through the use of technology – and thus embracing self-directed human evolution – is frequently debated. Disease, ageing and even death are all human realities that avant-garde technologies seek to end.[27]

If human beings are ready to embrace transhumanist technologies, these

discoveries must not remain available only to an elite. Scientific findings will become immaterial to a large sector of the population if their benefits are only accessible to a few. This is extremely relevant for creating *trust in science*.

We need new leadership models in the business and public administration domains, where policy ethics and fundamental values should be enshrined in individual and collective behaviours. People's concerns, needs, interests and values need to be supported by direct inclusion in policy design, where their participation could be self-initiated or self-directed.

As these technologies pose new questions regarding the meaning of human life and open up other existential debates, their multifaceted impacts need to be widely known, shared, and anticipated. For example, some even argue that these technologies could make us a form of sub-human species.[28]

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Whatever the case, governments, industry, and society in general need to come together to build new common understandings and shared commitments in a system of *collaborative governance*.[29] This would involve the processes of policy decision-making and management engaging people across the boundaries of public agencies, levels of government, and private and civic spheres to achieve a broadly inclusive public purpose.

Inclusive perspectives

As humanity embarks on this journey to transcend its limitations – but underscoring the fact that a million things could go wrong as we attempt to do so – knowledge sharing, inclusivity and meaningful dialogue will be deemed extremely necessary. The process will require conversations that take into account transversal and intergenerational perspectives.

Intergenerational dialogues and fora are a good way to share views and experiences. Younger generations can learn from past achievements, while older generations can learn from the new battles younger people face, and together think of ways to shape the future.

Involving youth requires a genuine investment. This means actively ensuring the well-being of youth, promoting opportunities to actively challenge gender norms, creating positions of influence for women, and addressing power inequities. Today 1.2 billion young people are potential agents of change.[30]

The UN Educational, Scientific and Cultural Organisation has stated that transversal approaches, inclusion, social behaviour and cultural agency are enablers of systemic change.[31] Nonetheless, women continue to be under-represented in the COVID-19 response and other decision-making fora, although their labour and indisputable leadership are keeping families, communities and nations running.[32]

The UN Secretary-General's 2021 report on women, peace, and security issued an urgent call for action to reduce military spending, and to increase investment in peacebuilding, education, health, and other public goods.[33] World military expenditure rose to almost US$2 trillion in 2020.[34] Meanwhile violence, conflict, and the subsequent political and humanitarian crises have displaced 82.4 million people from their homes.

This panorama is daunting, and reflects the urgency of the need to double down on efforts to build capacity, empower the hitherto powerless, and bring to the table all vulnerable groups, leaving no one behind. This

will require strong advocacy, political will and "champions" willing to challenge the status quo. Ultimately, every individual must adjust her/his/their behaviour accordingly and produce an inclusion ripple effect.

Foresight planning

Integration and foresight will become a fundamental part of the new paradigm if we are to embrace the "technology for humanity" vision. If emerging technologies are to fulfil their potential for improving human well-being and bridging equity gaps, their development and deployment must pave the way for a positive transformational impact on the world. Without the appropriate oversight, regulatory processes, and compliance mechanisms that set limits on the permissible features of these technologies, they may end up creating more conflict and tensions nationally and globally, while undermining the prospects for a safe, equitable, and secure future for humankind.[35]

By assessing the underlying key drivers of change as it relates to disruptive technologies and existential risks, all interested parties can develop projections that point to possible scenarios and informed strategic actions.[39]

Some entities are already working on this type of anticipatory and futurist vision. The Organisation for Economic Cooperation and Development (OECD) Recommendation on Responsible Innovation in Neurotechnology,[36] which was adopted by the OECD Council on 11 December 2019, is the first international standard in this domain. It aims to guide governments and innovators on ways to anticipate and address the ethical, legal and social challenges arising from novel neurotechnologies, while promoting innovation in the field.

Furthermore, the OECD Recommendation seeks to provide guidance on the various steps of the innovation process – e.g. research, technology transfer, investment, commercialisation, and regulation – so that benefits are maximised and risks minimised. It articulates the importance of:

- high-level values such as stewardship, trust, safety and privacy in this technological context;
- building the capacity of key institutions like foresight, oversight and advice bodies; and
- processes of societal deliberation, inclusive innovation and collaboration.[37]

The Council of Europe is also developing mechanisms to safeguard the integrity, privacy, and dignity of the human being, in particular those pertaining to the access to neural processes that underlie conscious thought, and that imply entry to a level of the self that by definition cannot be consciously concealed or filtered.

Individual identity, agency, and moral responsibility may be diminished through the merger of neurological and digital sensory experience and decision-making processes. Such outcomes could change the very nature of humanity and human societies.[38]

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Conclusion

When reflecting on emerging technologies, policy, and participatory perspectives, one may conclude that *security* must be collective and human-centred.

The concept of human security represents a departure from traditional orthodox positions, which focus on the security of the state.[40] The subjects of the human security approach are individuals, and the end goal of this approach is the protection of people from all sorts of threats, e.g. disease, poverty, environmental degradation, military action, terrorism, misinformation, etc.

Moving the security agenda beyond state security does not mean replacing it, but rather complementing and building on it. Central to this approach is the understanding that a lack of human security can undermine peace and stability within and between states, while an overemphasis on state security can be detrimental to human welfare.[41]

Today more than ever leaders in communities, countries, and globally must take a proactive approach and call for open and horizontal conversations on the intersection between science and policy.

Science cannot solve all of humankind's problems, and new groundbreaking discoveries may even endanger human beings. Modern policymaking, based on multidisciplinary and comprehensive participatory methodologies, must be the vehicle to achieve common understandings, reconciling *technology for the greater good* with political and business priorities. *Good* implies that it will solve social and environmental challenges.

In recent decades public policy has centred on the promotion of macroeconomic growth, but has done little to guarantee individual and societal well-being.[42] But it is possible to incorporate public values into policymaking, improving its effectiveness and increasing trust in institutions while informing and educating the general public. Public meetings, multisectoral engagements, external advisory committees, and mediation processes have shown their ability to increase the quality of decision-making and produce a positive impact.

The COVID-19 pandemic allowed us to create a new model for the integration of science, technology and policy responses. We must draw important lessons from this crisis, refine the model and create incentives to mainstream good practices.

The erosion of multilateralism, nationalist posturing, and the emergence of new actors and powers are changing the global order. International cooperation is failing.[43] This could be a pivotal opportunity for a wider societal response, where polymath approaches, strengthened communication, inclusive dialogue and renewed trust shape a new social contract.

Today more than ever leaders in communities, countries, and globally must take a proactive approach and call for open and horizontal conversations on the intersection between science and policy. As part of these conversations, all of us are called on to become *humanist leaders* wherever we are, and to act without delay on the knowledge and understandings that are being built.

The meaningful and effective participation of women, youth, indigenous peoples, persons with disabilities, the LGTBIQ+ community, and others is essential to building partnerships at all levels.

The current crises we are facing and the expansive modernisation of technologies for a huge range of purposes have underlined the urgency of the need to embrace our human and collective security, protect our fate as a species, and imagine futures that are safe, resilient, and good for all.

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