PANDEMICS AND INTERNATIONAL SECURITY: THE OUTLOOK FOR NATO

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(Photo credit: EPA, Maxim Shipenkov)

PANDEMICS AND INTERNATIONAL SECURITY: THE OUTLOOK FOR NATO

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EXECUTIVE SUMMARY

The Covid-19 pandemic has had a multi-faced impact on Western societies, quickly moving from a health crisis to a broader phenomenon deeply affecting the socio-economic and political landscapes. Multilateral institutions had to cope with unprecedented challenges, while the pandemic exposed existing patterns of great power competition applied to the global race for personal protective equipment, vaccines, and relevant raw materials. Nations – at least initially – seemed to abandon well-established patterns of cooperation to revert to national solutions to this very global challenge.

Global economy experienced disruptions in trade and in the functioning of the Global Value Chains (GVCs), as well as significant redistributions of wealth through drastic downs and ups of Gross Domestic Product (GDP) across the world. In less than two years, the pandemic experience prompted a deep revision of standard views on critical interdependencies, diversification, resilience of GVCs and security of supplies.

When it comes to international security, the pandemic mostly acted as a catalyst of existing trends, such as the geopolitical competition between the United States (US) and China – which has worsened, also due to the outbreak of the disease. As for the armed forces, in several NATO countries including France, Italy and the United Kingdom (UK), they have been called to operate in support of civilian authorities to deal with Covid-related aspects such as field hospitals, logistics, law enforcement, Covid tests or the vaccines' distribution – and NATO itself provided support through its bodies such as the Euro-Atlantic Disaster Response Coordination Centre (EADRCC).

International cooperation at a time of crisis. Covid-19 indeed proved to be a global challenge. The pandemic's widespread and indiscriminate development called for enhanced cooperation within the international community: insofar the pandemic generates cross-border effects, it requires global cooperative solutions.

However, the world's immediate reaction to the pandemic was slow and inconsistent, characterized by the scarcity of assertiveness on behalf of national institutions and international organization, the absence of enforcement mechanisms and contradictory communication. Driven by national considerations, governments mainly acted at local level. The lack of sustained commitments, which would have helped responding to the crisis, brought to a crucial lesson learned: investing in health and preparedness is definitely worth the cost, considering the fundamental importance of these resources when dealing with a pandemic.

Although the world has hardly been able to respond as a united force, there has been a rather unanimous agreement over the usefulness of vaccines as global public goods. Yet, this raised the issue of defining global public goods, and the extent to which vaccines belonging to such category make them free and available for everyone. Moreover, vaccines production and provision inevitably created new tensions in superpowers competition.

NATO played a positive, tailored role during the pandemic. In order to correctly respond to the ongoing health crisis, the European Union (EU) should encourage enhanced collaboration amongst its member states whilst strengthening its relationship with NATO.

The impact of the pandemic over economic security and resilience. Modern global economy's orientation towards "just-in-time" production, worldwide distribution and regional concentration of production centers make it fragile and susceptible to disruptions – as in the case of the Covid-19. Indeed, the pandemic had dramatic implications for global economy and its governance, with serious backlashes on trade, investments and the functioning of GVCs.

Covid-19 affected both the nodes of this system (e.g., factories, offices) and connections amongst nodes (e.g., transport hubs, flow of goods and people), causing both direct and indirect effects. While the former result from the pandemic itself and the sanitary policy measures necessary to contain it, the latter stem from measures taken to address direct effects as well as the lack of synchronicity in the outbreak and in the implementation of policy measures. As an example, the abrupt halt of shipments of materials and intermediary inputs in early 2020 represents a direct effect at the level of interconnections, and led to severe consequences on economic security and international relations.

Despite the need for universal action, the response to the pandemic in trade and investment policies was largely national or regional at best, driven by the immediate need to guarantee the security of supply, rather than any long-term strategy of building resilience into GVCs. The absence of appropriate international coordination amplified the effects of the Covid-19 crisis. At policy level, two main limitations can be identified that will impact the choices of solutions: the cost of the measures implemented to face pandemic-related problems (including financial, political, etc.) and the lack of trust among Allies, which prevented effective coordination of policy measures across GVCs. The future of GVCs will primarily be affected by macro-economic factors, strategic competition among world powers, and GVCs' very same resilience.

Looking towards the future, NATO could play a significant role in safeguarding modern global economy by raising awareness on the resilience and security of strategic value chains, collecting information from both sides of the Atlantic and improving their availability to the public, encouraging Allies to commit in self-assessment of supply chains resilience, and preparing its members for the inevitable next supply chain crisis.

What role for the military in a pandemic? The role played by the armed forces of NATO's members during the pandemic was very significant. Armed forces have the ability to respond in flexible, specialized and effective manner to almost any type of crisis. That is why, when the pandemic hit, military forces worldwide were among the first to respond. Not only did they provide reinforcements in terms of highly trained medical personnel, but also arranged for their troops to participate in the transport of vital supplies. All the whilst maintaining their primary duty of delivering credible and effective deterrence towards foreign adversaries. Because of unique skills and operational capabilities, the military instrument contributed to national responses to the crisis and, to a lesser extent, to regional cooperation in the Euro-Atlantic area.

So far, NATO structured its response to the pandemic crisis in three phases: the Initial Response phase (January-May 2020), the General Response phase (June 2020-May 2021) and the Specific Response phase (Autumn 2021). Throughout the pandemic, the Alliance ensured information sharing, collaboration, and brokering of mutual support across its members. NATO's armed forces also supported Allies and partners through transportation of medical supplies, deployment of medical personnel, and other logistic tasks. By doing so, NATO played a key role in preventing the health crisis from becoming a wider security crisis. Yet, in addressing requests of support by members and partners, the Alliance suffered problems of slowness and fragmentation.

The Covid crisis reinforced domestic resilience as an instrument of national power alongside others. In the defense and security realm, the concept of resilience mainly concerns civil-military cooperation. Going forward, NATO should foster civil-military relationship through integration, coordination and transparency. Determining factors to implement this process will be the legal context and at the democratic control of armed forces, states' national legacies and cultures, their threat perception, and the different models that NATO members adopt to integrate armed forces with other civilian actors.

The pandemic questioned the very role the military should prioritize in a period defined by a multiplication of tasks for the military within a limited budget. Looking towards the future, and the (likely) possibility of other pandemic crises, the cost of the military instrument should to be balanced against investment in other instruments of national power. Indeed, stretching allied armed forces, especially given the current strategic complexity of world's order, may lead to negative consequences on the effectiveness and sustainability of the forces, or the purposeful enlargement of a security agenda to non-security issues – a phenomenon known as "securitization".

The outlook for NATO. Here, an important question arises: what kind of role shall NATO prepare itself to play in the case of a future pandemic? The current and foreseeable security environment marked by great power competition will make more difficult to manage future pandemics while preserving the effectiveness of the military instrument of power. There is a need to clarify and define the possible role of NATO in such emergencies in the future, in the broader context of Alliance's adaptation and with a view to the upcoming *Strategic Concept*. The NATO's war-fighting capstone concept is a key milestone in such adaptation process, by positioning the Alliance to identify and overcome threats in a long-term perspective.

By looking at the Covid experience, there are probably four broad areas in which the Atlantic Alliance could provide an added value without departing from its core tasks or risking to over-securitize a health emergency.

First, enhancement of its ability to protect allied troops and guarantee the resilience and effectiveness of its missions and personnel, also building on the innovative praxis developed through the pandemic. This is a crucial aspect to maintain deterrence and defence posture – including through key exercises as happened in 2020-2021 – in a volatile international security environment where pandemics can drive further uncertainty, as well as to safeguard the achievements made by ongoing out-of-area operations for instance in the Western Balkans.

Second, NATO was already committed to improve the resilience of Allies, for instance by articulating in 2016 the baseline requirements for national resilience including civil preparedness. Covid-19

showed how a pandemic can challenge such resilience, also by exposing nations' limits and difficulties to cooperate. In light of this experience, the Alliance is reflecting on how to improve its capacity to help member states to face pandemics, also by reviewing the aforementioned resilience requirements, and should move forward in this regard.

A third area of improvement is the provision of logistic support to emergency infrastructures and distribution at the use of its member states and partners. This is a fundamental – albeit often overshadowed – task, as it enhances the political cohesion among Allies *vis-à-vis* external attempts to exploit the nationalistic tendencies fuelled by pandemic to seed divisions within the Alliance. It is also extremely important towards partners in the Euro-Atlantic area, North Africa, Middle East and around the globe, in order to safeguard and develop partnerships when the need for support is more dire. At the same time, considering limited resources and budgets, NATO should carefully reflect on the adequate balance between armed forces' war-fighting tasks and the support to civilian authorities for pandemic crises.

A fourth broad area regards the contribution to cope with challenges to economic resilience by building a shared framework to identify which sectors are, and/or might be, more directly affected by present and future health crises. This is certainly the case in military and – more broadly – security domains, where NATO can have an overview of where it would contribute to build resilient supply chains, also due to its ability to gather information from its members and produce foresight analyses and forward-looking, politically shared, policy documents. The Atlantic Alliance – due to the solid and recurrent interaction among its members – is also able to produce indirect, positive effects by creating trust, thus reducing in the medium and long term those uncertainties about behaviours that lead countries to adopt "autarchic" economic policies.

THE INTERPLAY BETWEEN COVID-19 AND INTERNATIONAL SECURITY

Sonia Lucarelli, Alessandro Marrone and Francesco N. Moro[1]

The pandemic's multi-faced impact on the West

The Covid-19 pandemic has had a multi-faced impact on Western societies, quickly moving from a health crisis to a broader phenomenon deeply affecting the socio-economic and political landscapes. Multilateral institutions had to cope with unprecedented challenges, while the pandemic exposed existing patterns of great power competition applied to the global race for personal protective equipment, vaccines, and relevant raw materials. Nations – at least initially – seemed to abandon well-established patterns of cooperation to revert to national solutions to this very global challenge.

The global economy has experienced disruptions in trade and in the functioning of the Global Value Chains (GVCs), as well as significant redistributions of wealth through drastic downs and ups of Gross Domestic Product (GDP) across the world. In less than two years, the pandemic experience prompted a deep revision on standard views on critical interdependencies, diversification, resilience of GVCs and security of supplies.

When it comes to international security, the pandemic has acted mostly as a catalyst of existing trends, such as the geopolitical competition between the United States (US) and China – which has worsened also due to the outbreak of the disease. As for the armed forces, in several NATO countries including France, Italy and the United Kingdom (UK), they have been called to operate in support of civilian authorities to deal with Covid-related aspects such as field hospitals, logistics, law enforcement, Covid tests or the vaccines' distribution – and NATO itself provided support through its bodies such as the Euro-Atlantic Disaster Response Coordination Centre (EADRCC).

International cooperation, global supply chains and the need for resilience

The global impact of Covid-19 has been indisputably huge and multidimensional. A real test of the effectiveness of global governance and international cooperation, Covid-19 has underlined some of the limits of both. The immediate reaction of states and international institutions has been slow and uncertain. The absence of consolidated mechanisms, problematic decision-making in relevant institutions, failures of communication, a nationalistic-conditioned response, diffused fear and mistrust, have all contributed to difficulties to enact an efficient international and global cooperation

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to stop or slow down the diffusion of the virus. Later on, global cooperation has continued to show its limits in two respects: the uneven distribution of vaccines beyond the West, and great powers competition particularly as far as the US and China are concerned. Yet, over time improvements have occurred. In this context, NATO has played a relevant, positive role in performing supportive tasks such as the deployment of field hospitals, the transportation of medical tools and staff for member and partner countries. Moreover, inter-institutional cooperation between NATO and the European Union (EU) has made a step ahead including with regards to information sharing.

As for global economy Covid-19 has affected international trade and the structure of global production centred on GVC. Here too the early days of the pandemic showed the re-emergence of pressures to adopt national solutions in order to solve the most pressing problems such as the availability of personal protective equipment and intensive care unit machinery, bypassing the established international agreements and standard patterns of cooperation. The Covid-19 affected the very definition of countries' perception of core national interests, placing health issues at the hearth of national security. After the immediate emergency connected with the first wave, a more thorough rethinking of the existing structure of production in the global economy has begun. Economic and security considerations have become increasingly intermingled. The debate on re-shoring, which had already started in Western countries over the 2010s, has now included a security dimension at its very core. The disruption to production and trade brought by the pandemic has shown how many economic domains can have an impact on security (even on the production of defence equipment). Shortages in micro-chips and batteries, for instance, have heavily affected civilian industries and military procurement. Accordingly, the existing international structures dealing with security – starting with NATO – have begun to craft their role in this regard.

The outlook for NATO

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Second, NATO was already committed to improve the resilience of Allies, for instance by articulating in 2016 the baseline requirements for national resilience including civil preparedness. Covid-19 has shown how a pandemic can challenge such a resilience, also by exposing nations' limits and difficulties to cooperate. In light of this experience the Alliance is reflecting on how to improve its capacity to help member states to face pandemics, also by reviewing such resilience requirements, and should move forward in this regard.

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Over 2020-2021 NATO has shown to be already quite well equipped to concerning the first area, while there is much room of improvement in the second and third ones, considering for example the modest resources of the EADRCC which substantially limited its contribution to face the first Covid waves. More challenges exist in performing well in the fourth and last area. Indeed, the identification of the sectors that deserve specific protection is subject to notable uncertainty, particularly to avoid an excessively long, and ultimately unrealistic, list of sectors to protect. Moreover, the process of identifying the sectors where to build more resilient and robust supply chains must consider that much can be lost by a more centralized planning of production. NATO can certainly act as a hub for coordinating activities (such as producing scenario and implementing joint exercises) that help strengthening resilience and robustness of supply chains where national security is involved. Yet, one lesson of the past two years is that Allies all have to strike a delicate balance between the benefits of international cooperation and the very pressing requirements of domestic constituencies.

Against this peculiar backdrop, the 2021 Academic Conference – held live in Bertinoro on 21-22 October 2021 by gathering over 60 participants – discussed a number of aspects of the interplay between Covid, international security and NATO. The first Working Group (WG) took a comprehensive view on international cooperation to address pandemics. The second WG focused on resilience and security of GVCs. The third WG adopted a long-term perspective on the influence of pandemics on the evolution of the military instrument of power. Accordingly, the publication is structured in three

sections. Each section is devoted to a specific WG and includes the respective two papers that have been presented during the Conference as well as the report summarizing the subsequent debate.

As a whole, as for publications resulting from previous Academic Conferences jointly organized by NATO Allied Command Transformation (ACT), University of Bologna and Istituto Affari Internazionali (IAI), this report is meant to offer the reader a complimentary ensemble of thought-provoking views, to favor an intellectual exchange between the policy-making and academic communities, and to move forward the international debate on these topics.

(Photo credit: EPA, Narendra Shrestha)

WORKING GROUP
I

INTERNATIONAL COOPERATION ON PANDEMICS DURING THE COVID-19 PANDEMIC

Rosa Castro - European Public Health Alliance

Abstract

This paper provides an overview of the existing frameworks for international cooperation during pandemics. It considers some emerging lessons from the Covid-19 pandemic and reflects on shortcomings identified at different levels of governance. Among these, are the lack of sustained commitments, including financial investments to prepare for and respond to pandemics. While previous outbreaks have led to deeper cooperation frameworks, such efforts have faded in time. The ongoing pandemic has reminded that health investments offer a great return on investment and that investing in preparedness has insignificant costs when compared to the losses and costs due to a pandemic. The paper concludes by outlining a few recommendations and new initiatives that have been developed in response to the current crisis. These include a proposal for a global pandemic treaty, deeper cooperation at EU level to prepare for and confront cross-border health threats, and stronger but narrowly focused cooperation with other sectors (such as civil-military cooperation and cooperation between the EU and NATO).

Introduction

Covid-19 reminded the world about the global nature of pandemics and their potential to lead to health, socio-economic, trade and security impacts worldwide. While several global and regional cooperation frameworks to prepare for and deal with pandemics exist, numerous barriers have complicated and delayed the response to Covid-19.

The initial phase of the pandemic called for rapid assessment and management of risks, including through measures disruptive to travel and mobility, and consistent communication of risks to the public. Flaws in existing frameworks led to increasing mistrust and prevalence of nationalistic approaches, including in the enactment of measures such as travel and export bans. Among the reasons were the lack or incompleteness of mechanisms to enforce preparedness and response obligations, insufficient funding, and limited capacity for decision-making by key actors such as the World Health Organization (WHO).

In addition to the problems related to lack of coordination, mistrust, and inconsistency of policies, the second phase of the pandemic – characterized by a better understanding of the disease, the rapid development, authorization, and production of new vaccines, therapies, and diagnostic tests — has

also been affected by the lack of a global framework to ensure equal and effective access to these medical tools.

The lack of suitable organizational and institutional arrangements for pandemic preparedness and response has resulted in delays and inefficiencies, numerous avoidable deaths, and significant damages at global, EU and national levels.

This paper provides an overview of the existing and currently changing frameworks for cooperation in pandemics, focusing on the role and interactions of major international organizations (IOs) such as the WHO, the EU, and NATO with each other and with their national counterparts. After describing the main frameworks for cooperation during the Covid-19 crisis, the second section looks at some shortcomings in the response to Covid-19. The last section outlines a few initial lessons and recommendations for the future.

Existing frameworks for pandemic cooperation

Why do we need suitable pandemic cooperation frameworks?

While the exact time and frequency at which pandemics will emerge is impossible to predict, individual experts (Garrett, 2005)[1] and groups (see, among others, UN High-Level Panel on the Global Response to Health Crises, 2016; GPMB, 2019; Center for Health Security, 2021; GHS Index, 2019) have frequently warned about the possibility of a pandemic of the proportions of the Covid-19. Despite these admonitions, the threat of a pandemic and of its disrupting consequences for society was widely ignored and only a few countries – mostly those that had been previously exposed to previous outbreaks, especially in South-East Asia – showed more adequate levels of preparedness and response during the Covid pandemics.

Past outbreaks, such as the Ebola epidemic in West Africa in 2014, the H1N1 and SARS outbreaks, have often prompted calls for better preparedness and response frameworks, but being rapidly followed by cycles of total neglect. For instance, the 2003 SARS epidemic in 2003 prompted the revision of the WHO International Health Regulations (IHR), and the 2009 H1N1 influenza pandemic was followed by at least 11 high-level panels and commissions formulating recommendations for global pandemic preparedness and response. Despite this, there is wide agreement that the world was caught unprepared for Covid-19.

With widespread agreement in the scientific community that such events are likely to become more frequent, also due to the increased and compounded effects of climate change, increased deforestation, environmental degradation, and lack of control on animals that are likely to be vectors or hosts of pathogens (see also Jones et al., 2008; Dobson et al., 2020), strengthening cooperation for pandemics in a forward-looking and holistic approach seems crucial to avoid past errors (see The Independent Panel, 2021a).

[1] The author observes that "highly virulent, highly transmissible pandemic influenza that circulates the world repeatedly for more than a year" would end up killing more people than all the known weapons of mass destruction "save, perhaps, a thermonuclear exchange".

Global frameworks of cooperation for pandemics: the WHO

The WHO is the main international organization with legal and technical competences to prepare for and respond to pandemics. The global framework for preparedness for global health emergencies is based on the binding WHO IHR (IHR 2005), which have, over time, incorporated some lessons from past outbreaks such as HIV, Ebola, H1N1, SARS (WHO, 2011).

Nonetheless, several important gaps related to WHO governance, including funding gaps, lack of coordination between headquarters and regional offices, and lack of transparency and accountability had been identified before the Covid pandemic (Gostin, 2016). Beyond these global issues, the impact of the global framework directly depends on national implementation. Evaluations before Covid showed a very low level of national implementation of the IHR (Talisuna et al., 2019) with many European countries that had not submitted their reports to the Joint External Evaluation framework, which aims to assess national capacities within the IHR (WHO, 2016).

The Ebola crisis evidenced gaps in funding, health system capacities and reporting at national level despite clear international obligations with public budget cuts imposed after the 2008 financial crisis reported as one key part of the problem. Other problems included the lack of coordination and inefficiencies at the interface between risk assessment (surveillance and alert systems) and the management of health threats. For example, during the Ebola crisis, the WHO Director General was accused of waiting too long before declaring a Public Health Emergency of International Concern (PHEIC), which only came after four months and presumably after pressures from non-governmental organizations operating in the affected regions (Gostin, 2016). An additional problem that emerged during the Ebola outbreak was the absence of sufficient incentives for coordinating research and development (R&D) activities, and uncoordinated approach to the use of public health measures such as quarantines, travel bans and social gathering restrictions.

The above-mentioned problems have also been evident during the ongoing Covid pandemic, and while a rapid race led to the unprecedentedly fast development of new vaccines and therapies, the lack of a global R&D framework to respond to pandemics has resulted in nationalistic policies and limited access to such technologies worldwide (Mancini, 2020). In addition, while data sharing has occurred at an unprecedented scale, the availability of data and technological solutions has not been matched with the actual capacities to respond to the crisis (The Independent Panel, 2021a).

European Union

According to the Treaty on the Functioning of the European Union (TFEU), the EU shares public health competences with its member states. Article 168 of the TFEU calls the EU to act on global health issues by fostering cooperation with third countries and IOs while reserving responsibility for organising national health systems in the hands of member states.

The EU Decision on Serious Cross-border Threats to Health (Official Journal of the European Union, 2013) provides the framework for EU action related to crisis preparedness and response to cross-border health threats. It sets up an Early Warning and Response System (EWRS) and a Health Security Committee (HSC), which coordinates responses to outbreaks and pandemics, both within and outside the EU. Past epidemics have also been a major driver for deeper cooperation and for the creation of the existing legislative framework at EU level. The European Centre for Disease Prevention and Control

(ECDC) was set up to strengthen the EU's response capacity, and to provide technical support to member states after the SARS outbreak in 2003 and became operational in 2005. The ECDC oversees the surveillance, detection and risk-assessment of threats, epidemiological surveillance, and the operation of the EWRS. While its work was positively evaluated after the Zika and Ebola outbreaks (PwC, 2019), several limitations were identified, including on the ECDC's capacity to adapt to changes in the member states considering reduced public health funding, limited capacities to expand its staff, and limits on cooperation with member states (Flear, de Ruijter and McKee, 2020).

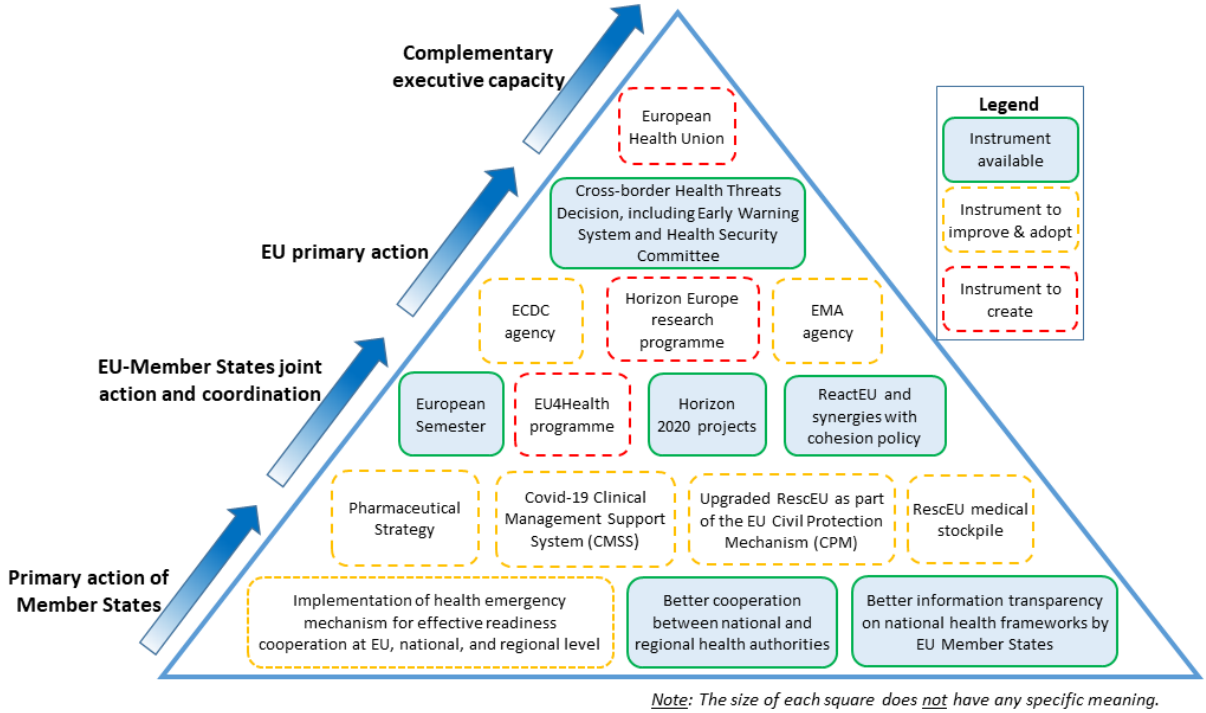
Overall, while there is a strong case for stronger coordination to prepare and respond to cross-border health threats (Martin & Conseil, 2012)[2] the EU framework remains highly fragmented. Among the reasons, are gaps in the implementation of the EU Decision on Serious Cross-border Threats to Health (ECA, 2016) and the limits imposed by the EU treaty in terms of respecting the competences of member states (Anderson, Mckee and Mossialos, 2020).

The Covid-19 pandemic has evidenced several areas in need of urgent reform. These include better integration of early warning and prevention strategies with responses, especially in the case of zoonoses (diseases spreading from animals to humans) where collaboration between the animal health and human health sectors is critical (ECDC, 2017). Another critical problem is the EU's inability to coordinate responses considering its limited competences on public health, which proved to be highly inefficient during a pandemic response (ECDC, 2017). While the ECDC has issued recommendations in several key areas during Covid-19 (see for example ECDC, 2020), as these are not binding on member states, uncoordinated and abrupt changes have been implemented national level. In addition, while the ECDC has competences to collect and share data, the lack of consistency across of data has clearly limited the response to Covid-19. And while EU members share data on an ongoing basis, the quality and level of detail of shared data is heterogenous, which further limits the EU response (Dąbrowska-Kłosińska, 2019) as well as creates distrust between countries (Apuzzo & Gebrekidan, 2020).

Figure 1 below presents a summary of available instruments, those that should receive further support, and those that do not currently exist in EU's pandemic preparedness and response mechanisms.

[2] The authors provide a review of arguments in favor and against harmonization at EU level.

Figure 1: Pyramid of instruments at the disposal of the EU and its member states (EPRS, 2021)



Note: The size of each square does not have any specific meaning.

Faced with the lessons from Covid-19, the EU Commission recently presented a package of reforms under the umbrella of a European Health Union (ECb). These include a reform of the Regulation on serious cross-border health threats, stronger mandates for the ECDC as well as for the European Medicines Agency (EMA) to respond to health emergencies, and the creation of a new EU authority (Health Emergency Preparedness and Response Authority - HERA) (EC, 2021a) to support preparedness for health threats through intelligence gathering and to respond through the development, production and distribution of medical countermeasures (e.g., vaccines, medicines, tests and protective medical equipment). The creation of the new authority HERA has been modelled after the US Biomedical Advanced Research and Development Authority (BARDA), and will be a crucial part of the coordinated end-to-end preparedness and required for the future.

Finally, as cross-border health threats become more complex (ranging from naturally occurring to nuclear and to cyber and bio-terrorist threats), and increasingly require a multi-disciplinary and anticipatory analysis, the coming years will require an evolving approach to hybrid and multi-vector threats, and to intentional threats, involving the use of emerging technologies in various areas (biological technologies but also artificial intelligence and others) (Pupillo et al, 2021).

The role of NATO during pandemics

NATO's main contributions during the Covid-19 pandemics

The EADRCC and the NATO Support and Procurement Agency (NSPA) were among the key elements for NATO's response. The EADRCC is the main NATO's civil emergency response mechanism. Established in 1998 by the Euro-Atlantic Partnership Council (EACP) as a cooperation mechanism between Allies and partners on civil emergency planning and international disaster relief, the EADRCC has significant experience from previous events, acting as a clearinghouse to coordinate requests and offers of international assistance. Its mandate allows it to respond to requests in areas where the Alliance is militarily involved, which has included countries of the Mediterranean Dialogue, the Istanbul Cooperative Initiative, and others. During the Covid pandemic, the EADRCC received requests from Allied and partners. For instance, Estonia, the Czech Republic, Latvia, Lithuania, Luxembourg, Norway, Slovakia, and Turkey responded to EADRCC requests for personal protective equipment (PPE) from Italy and Spain. Allied members also provided support to partners, including Afghanistan (PPE), Bosnia and Herzegovina (PPE, tents, field beds, medical equipment), Kosovo (medical equipment, food and clothing assistance, test kits), and the Republic of Moldova (PPE, ventilators) (Mesterhazy, 2020).

The NSPA is responsible for carrying out purchases, stockpiling, and the logistics related to the transportation of supplies. In addition, NATO also activated several missions with the aim of facilitating the transportation of equipment and personnel and was involved in the production and donation of 3D printed medical supplies (NATO, 2020b).

NATO's cooperation with the EU

Cooperation between NATO and the EU, which is based on the framework of the 2016 and 2018 *Joint Declarations* has been particularly important during the response to Covid. As recognized in this framework, common challenges for NATO and the EU include countering hybrid threats, enhancing operational cooperation, cybersecurity, and defence, strengthening defence capabilities and the defence industry and research, conducting exercises, and supporting the capacity building efforts undertaken by Eastern and Southern partners (NATO, 2016). For health threats, cooperation in these areas can facilitate mutual learning for the management and response to crises, including to hybrid threats, as well as a more comprehensive international approach – albeit one limited by the geographical scope of NATO and the EU.

EU-NATO cooperation during the Covid pandemic has developed under informal mechanisms foreseen on this cooperation framework, which have included, for instance weekly coordination calls between the Deputy Secretary General of NATO and the EU counterparts to discuss issues such as Global Supply Chains (GSCs), economic effects, repatriation of citizens (NATO, 2020a). Key areas of interest include defence cooperation during the pandemic, relief measures and risks related to strategic infrastructure in Allied countries (Lațici, 2020). In 2020, an EU Task Force at the level of the European External Action Service (EEAS) and the EU Military Staff, and coordinated with NATO's EADRCC (EEAS, 2020), was set up to support the exchange information among member states' armed forces on military assistance in support of civilian authorities to help fight the coronavirus pandemic. The aim was to enable the sharing of best practices and lessons learned, and to reinforce strategic communication. A common response to the crisis also took place during the EU-NATO bi-annual

meeting on 19 May 2020, which covered common responses, emerging technologies, and ongoing EU military operations (NATO, 2020c).

While initially focused on exchanges of information, the EU and NATO have increasingly expanded their cooperation during the pandemic, especially as with regarding to military mobility and countering disinformation (Mesterhazy, 2020). Based on this experience, a recent document elaborated for the European Parliament (EP)'s Committee on Industry, Research and Energy (ITRE) concluded that preparedness and response to face chemical, biological, radiological, and nuclear (CBRN) threats continue to be part of regular civil and military cooperation between NATO and the EU. The document also proposed that the EP's delegation to the NATO Parliamentary Assembly (DNAT) could play a key role in fostering this cooperation (Rimpler-Schmid et al., 2021).

The civil-military interface of cooperation during pandemics

At national level, military forces in different states, including members of the Alliance, were also mobilized to provide support for logistical operations, from those related to the provision and transport of critical medical supplies, to the implementation of Covid tests, up to manage the vaccination campaign's logistics like in Italy. While these activities were not carried out by NATO and had dissimilar impacts across countries (Brustlein, 2021), they do reflect the increasing presence of military and defence-oriented actors and organizations, which contributed to fast and effective parts of the pandemic response at specific moments and in some countries, for instance, during the first wave in Italy.

NATO's main comparative advantages and capabilities for pandemics

NATO's experience and capabilities to deal with crises, helped it to coordinate a large-scale and fast mobilization, as in numerous missions to transport medical personnel and supplies or set up field hospitals in member and partner countries (Mesterhazy, 2020).

While covering a range of activities, the Alliance has focused on avoiding impacts on its normal objectives – maintaining its deterrence and defence capabilities – while carrying out additional activities during the pandemic (Mesterhazy, 2020). This is reflected on its emphasis to address geopolitical goals, and especially misinformation coming from Russia and China (Mesterhazy, 2020).[3] Overall, the response by NATO shows its added value on crisis management, which has been similarly matched by military interventions at national level. This opens the question of whether and to what extent should NATO become more involved in preparedness for health threats and in general for CBRN threats in the future.

[3] The author explains that "NATO is taking the steps necessary to counter Russia's dangerous and divisive disinformation campaigns and China's insidious attempt to alter the narrative on the virus's origins and spread".

Shortcomings in cooperation during Covid-19

This section reflects on some common issues faced at different levels of governance involved in pandemic cooperation. In addition to such shortcomings at international and regional level, national implementation and strong institutions are central to an effective response to pandemics. Despite this, there were important gaps at national level, including within the EU before the Covid pandemic (Speakman, Burris and Coker, 2017). In part, this is due to decreasing health investments, and limited attention to health threats and resilience-oriented policy following the financial crisis (Rechel, 2019). Summing up, both the global (Gostin, DeBartolo and Friedman, 2015) and EU (Anderson, Mckee and Mossialos, 2020) governance of pandemics appear too fragmented and insufficiently coordinated, most countries are unprepared, and existing coordination mechanisms appear too weak now. This setting can easily lead to collective action problems, such as the current gap in equitable distribution of vaccines worldwide. Table 1 below summarizes a few shortcomings at each governance level based on lessons from the Covid pandemic and previous pandemics.

Table 1: Shortcomings on existing pandemic cooperation frameworks

Cooperation for pandemics	WHO (UN)	EU	NATO	Country-level
Framework for preparedness and response	**IHR 2005**	**Serious cross-border health threats Regulation**	**Cooperation for emergencies, including health threats**	**Preparedness and response plans and infrastructures**
Shortcomings	• Lack of enforcement of IHR obligations • Unstable budget (depending on members) • Limited independency for the WHO • No legal framework for global R&D; limited capacity to influence work by other IOs (e.g., the WTO)	• Limited capacity for enforcement • Lack of competences to coordinate a response • Lack of a framework for R&D, procurement and manufacturing of medical technologies during pandemics (now being addressed through HERA)	• Limited competences to act during pandemics • Emphasis on a few elements related to global security (emergency protection, repatriation of citizens, GSCs)	• Lack of financial resources • Lack of implementation of national obligations under the WHO IHR • Reduced investments on health systems, including infrastructure, the health workforce (horizontal investments in health beyond pandemics) • Under-developed systems for inter-sectorial collaboration

				between sectors
Interfaces of cooperation	UN (other agencies); EU (Memorandum of Understanding); WHO Europe (different geographical coverage)	Cooperation with the WHO; WHO Europe; NATO and EU member states	Members, partners, EU; WHO	WHO; EU-27, WHO Europe (53 members); NATO (members, partners); other organizations and WHO regional offices across the world

Limited learning from the past: cycles of attention and neglect

Many recommendations stemming from previous outbreaks have not been duly (or completely) implemented. The Global Preparedness Monitoring Board (GPMB) raised this in its latest annual report: "for too long, we have allowed a cycle of panic and neglect when it comes to pandemics: we ramp up efforts when there is a serious threat, then quickly forget about them when the threat subsides" (GPMB, 2019). Even if the SARS pandemic led to a reform of the WHO IHR in 2005, its implementation remained incomplete, and the same applies to lessons emerging from other pandemics, such as the lack of a global R&D framework for pandemics, which was highlighted during Ebola.

Insufficient funding for national preparedness

Lack of sufficient funding for pandemic preparedness is another constant. Many countries lacked a robust preparedness plan as well as core public health capacities needed for an effective response and earlier self-assessments as well as the Joint External Evaluation Process and the Global Health Security Index showed this. Limited funding is confronted with the increasing occurrence of drivers of epidemics, such as increasing travel and trade, climate change, deforestation and biodiversity threats, conflicts, and notwithstanding evidence that pandemic preparedness is just a fraction of the cost of responses and losses incurred associated with pandemics.[4]

Shortcomings in alert systems& slow/ineffective risk assessment

Some shortcomings have been identified with the surveillance and alert systems at all levels: globally, regionally, and nationally. National capacities as well as the ability to implement national obligations to share information as early as possible are key to ensure early alerts as well as to take informed decisions as fast as possible. During the Covid-19 outbreak, a mix of early actions was accompanied

[4] The total cost of the economic losses due to SARS was estimated at USD 60 billion. The 2015 MERS outbreak in just one country, the Republic of Korea, with 185 cases and 38 deaths, cost USD 2.6 billion in lost tourism revenue and USD 1 billion in response costs. The 2016 Commission on a Global Health Risk Framework for the Future argued that its proposed preparedness spending boost of USD 4.5 billion annually was a small investment compared with a scenario of the potential global cost of pandemics over the whole of the Twenty-First Century, which they assessed as being "in excess of USD 6 trillion".

by delays and insufficient or slow sharing of information, which facilitated the spread of Covid from an initial outbreak into a global pandemic.

Following early alerts, a pivotal point in the response is the declaration of a PHEIC, which is the responsibility of the WHO Director General considering the advice of an Emergency Committee. For Covid-19, the PHEIC declaration arrived on 30 January 2020 during a second meeting of the Emergency Committee, but by then, 98 cases had been reported in 18 countries outside of China (The Independent Panel, 2021), which led experts to conclude the PHEIC should have been declared during the first meeting of the Emergency Committee on 22 January 2020 and that the WHO was slow in elaborating on the assessment of the risks revealed by early alerts. According to The Independent Panel for Pandemic Preparedness and Response, with a respiratory infection as Covid-19, the application of the precautionary principle was justified even with limited scientific evidence for the likelihood of human-to-human transmission. On this basis, the Independent Panel concluded that the alert system was not fast enough and that the IHR (2005) constrained rather than facilitated rapid action.

Shortcomings on meaningful cooperation and solidarity

Pandemic preparedness and response are core functions that should be supported by all sectors rather than by the health sector alone. Such multi-sectorial cooperation is needed at all levels, including nationally, regionally, and locally (The Independent Panel, 2021).

In addition to this, consistent cooperation and solidarity among countries has also been lacking. While bilateral, regional, and even global cooperation, for instance for the provision of protective material, sharing of data, and procurement of other medical countermeasures, has occurred, there is still a clear need to ensure that future health threats are addressed in a coordinated manner, with solidarity between countries, rather than left to the good will of countries and sectors, and emergence of ad hoc cooperation mechanisms to address problems.

A key example of this gap has been the development of new vaccines for Covid-19, which have represented a triumph for science and scientific collaborations and at the same time a failure for global solidarity and cooperation in terms of equitable access to vaccines (Stephenson, 2021).

The development of vaccines and therapies has occurred in a collaboratively and efficient manner, with global collaborations supporting rapid data sharing and exchanges. However, vaccines, therapies and diagnostic tests remain inaccessible for most people in low- and middle-income countries.

The WHO Access to COVID-19 Tools (ACT) Accelerator and its COVAX facility were developed to anticipate these risks. However, in the absence of a coordinated framework to accelerate global R&D and ensure access to final products (Lurie, Keusch and Dzau, 2021), COVAX and the ACT have had a very limited impact (Sachs et al., 2021). Solving this problem will require an adequate framework plus a thorough financing system involving the International Monetary Fund (IMF), the World Bank, multilateral development banks, and others to ensure that medical countermeasures reach the global population (Sachs et al., 2021). This is not only important as a matter of global solidarity and cooperation but also for an effective global response; a slow vaccination pace across the world could facilitate the emergence of new virus variants, which would further delay the end of the pandemic.

Lessons for the future

One lesson emerging from Covid-19 and previous crises is that sustained action and financing are key to prepare for future threats. After reviewing evidence about the response to Covid-19, the Independent Panel concluded that "system-level change is needed to overcome the manifest failure of the international system to prevent, contain, and mitigate the impact of a pandemic". The negotiation of a Global Treaty on Pandemics (WHO, 2021) and the development of similar institutional frameworks and agencies at regional and national levels could facilitate this. The following aspects have been deemed crucial for an improved system incorporating the lessons from Covid-19.

Stronger leadership, better coordination, and expanded & sustainable budgets

Coordination and leadership are crucial elements of an effective response at national, regional and international levels. While the international health framework has progressed over the past decades, the lack of clear roles and responsibilities and the inability to leverage cooperation between diverse actors (e.g., the WHO, the IMF, the World Bank, and the UN Secretary General) remains a major problem. To ensure the world is better prepared for the next pandemic, the international system requires political leadership at the highest levels, a framework that enables synergies between international, regional and national organizations, increased pandemic capacities, and effective monitoring and compliance systems. Among the recommendations are to strengthen the work and independence of the WHO, to develop a Pandemic Treaty (a Framework Convention under the WHO), and to set up a senior Global Health Threats Council as this would help to secure the political leadership and attention needed for pandemics.

This framework should be accompanied by a sufficient budget for the WHO, and by the ability of the Director General of the WHO to remain independent to take key decisions. More in general, access to financial resources for pandemics will be key both for preparedness as well as for the capacity to mobilize sufficient funds in a rapid manner in a pandemic.

Similar recommendations have been formulated at regional level for the EU. While a clearer concentration of powers on public health emergencies would require a change in the EU treaties, the recent European Health Union proposal (ECb) includes elements to ensure more coordination at EU level, and has been accompanied by an expanded health budget – EU4 Health programme (ECa). In particular, the financial endowment for the newly created HERA (EC, 2021b), which is a coordinating structure within the EU Commission, amounts to EUR 6 billion over the next 4 years, with the possibility of up to 24 additional billion during emergencies.

Likewise, several countries have created or endowed their existing mechanisms and agencies with additional resources and competences. France (Deutsch, 2021) and the UK have planned to set up BARDA-like agencies, and South Korea significantly expanded the competences and budget of the Korea Centers for Disease Control and Prevention (Asian Development Bank, 2021).

Improved surveillance and alert systems

At the same time, there has been a general move towards updating and streamlining surveillance and alert systems worldwide. There is a need for faster data sharing and publication of information,

accompanied by ability of the WHO to publish such information, send expert missions immediately and be able to make fast evidence-based decisions. In this area, the WHO needs to assume a leading role in bridging the gap between the opportunities brought forward by new technologies and the slower pace at which surveillance, alert systems, and subsequently, risk assessment decisions are taking during health emergencies.

Platforms to accelerate the development, production, and access to medical countermeasures

This is a perhaps the biggest gap of the current framework for pandemics. While scientists developed new vaccines in record times, and the ACT Accelerator and COVAX were also established very rapidly, the lack of an existing negotiated platform to produce medical countermeasures and ensure their rapid and equitable delivery has been a major failure. If only national (BARDA; plans in the UK and France), or regional answers (the EU's HERA) emerge (Lurie, Keusch and Dzau, 2021), unequal access to medical countermeasures could be a problem also in the future.

Stronger cooperation between different sectors and organizations

NATO (as well as other actors) has played a limited but important role during the pandemic, by supporting its members and partners and by increasingly exchanging information and cooperating with the EU. Its main activities and interests are circumscribed to elements related to global security such as emergency protection, repatriation of citizens, and work on GSCs. While this narrows the potential role that NATO could play in future pandemics and CBRN threats, it is also arguably the most appropriate role for NATO and other defence-related actors. Global health cooperation for pandemics includes but goes beyond fast and effective responses and encompasses a range of complex issues at the interface of health system preparedness, socio-economic conditions that affect health and underlying problems such as inequalities, which are less prone to be addressed by defence-oriented organizations. Therefore, while an active cooperation with NATO and other actors to ensure that emergency mechanisms are well connected and able to response quickly and effectively will be key for future threats, including CBRN, excessive involvement of defence and military organizations and actors could lead to problems related to an excessive "securitization" of global health issues (Gibson-Fall, 2021), which in the past has led to shifting priorities away from other critical health issues and to unbalances between low and high-income countries (McInnes & Lee, 2006).

Conclusions

Better pandemic preparedness and response is a key element of investing in resilience. Such investments, which need to include stronger coordination frameworks for pandemics, should not be narrowly constructed; health investments indeed offer important returns for society (Masters et al., 2016).

On the other hand, preparing for pandemics can help to decrease vulnerability and increase resilience for other threats such as climate change. These smart investments require organizations to learn from experience, and to use adequate new indicators and monitoring tools. The capacity to coordinate and centralize decisions during health emergencies is a central element of this as shown by the

shortcomings in the response to Covid-19 at global and EU level (PwC, 2019). Preparedness for pandemics could also benefit from lessons learned by actors at different levels and from many different areas, avoiding a “threat by threat” siloed strategy and preparing for future and diverse threats.

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VACCINES FOR COVID-19: A CASE OF GLOBAL PUBLIC GOODS?

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Abstract

Covid-19 has been indiscriminate. While the impact of the disease has varied across the globe, all populations and all states have proven vulnerable to its effects. Global exposure has led to calls for international cooperation. The upshot has been a patchwork of initiatives and crab-like progress toward containing the pandemic. Vaccines have loomed large in this mix of efforts, and governments and IOs have at least held the shared view that global inoculation is the route out of crisis. Some important international actors have taken such a position by referencing global public goods, so signalling a commitment to some higher political, even moral, standard of action. Whatever the attractions of such a signal at a time of global turmoil, Covid-19 vaccines are an imperfect example of a global public good. Further, those making the case for their elevation (and here China looms large) have not always matched their words with deeds.

The necessity of vaccination

On 30 January 2020, the WHO declared the outbreak of the novel coronavirus (2019-nVCov or SARS-CoV-2) in China to be a PHEIC. At that point, little was known epidemiologically about the virus and the illness (Covid-19) it could cause. It was, however, assumed that the virus could spread with ease and that measures of containment would be required. In the absence of proven therapeutic treatments and effective vaccines, and as case numbers climbed rapidly in the early months of 2020, an international policy consensus (endorsed by the WHO) emerged in favor of non-pharmaceutical interventions (NPIs). A menu of measures (border closures, work-from-home orders, social distancing, mask mandates, restrictions on movement and social gatherings) complemented by mass testing and contact tracing was then implemented across the world, with varying levels of stringency and effectiveness (Hale, 2021).

NPIs have inherent drawbacks. They are difficult to sustain over time given the extraordinary levels of social and political oversight required, are met with differing and diminishing levels of compliance among target populations and cause considerable social and economic disruption (Petherick et al., 2021; Masiyiwa, Strive in Ryan Heath et al., 2021). The precise impact of NPIs on the trajectory of the global pandemic has also been difficult to ascertain. Public health advice, typified by WHO guidance backed by government policy among the vast majority of states, has supported such measures on the assumption that they reduce viral transmission and thus infection. Numerous studies have thus credited NPIs and associated “lockdowns” with curtailing the pandemic in national settings (Hale et al., 2021). But a smaller body of literature has questioned the robustness of this causal link, and has

pointed to the harms of NPIs ("poverty, food insecurity, loneliness, unemployment, school closures and interrupted healthcare") (Joffe, 2021; Liu et al., 2021; Chin et al., 2021).

As the label suggests, NPIs are a temporary substitute for targeted medical action, be that in the form of therapeutic treatments for those who have become ill or the administration of a vaccine with prophylactic effect. NPIs, in other words, are not regarded as a viable long-term approach in their own right. The global scientific and political consensus is that mass vaccination is central to any "exit strategy" from the Covid-19 pandemic (so facilitating a transition from a global pandemic to a disease that is endemic and manageable) (Brilliant et al., 2021).

Work on developing vaccines began as soon as the genetic sequence of SARS-CoV-2 was made public by China in January 2020. In May 2020, the Trump administration launched Operation Warp Speed. That initiative identified eight vaccine candidates for support from over one hundred then in development. In setting a target date of January 2021 for the roll-out of a vaccination program for Americans, Secretary of Health and Human Services Alex Azar described OWS as potentially "one of the greatest scientific and humanitarian accomplishments in history" (US DoD, 2020). In the UK, a Vaccine Taskforce was established in April 2020 to facilitate the vaccination of the British population and bring "the quickest possible end to the pandemic" (Bingham, 2020). China and Russia also launched state-backed vaccine development initiatives. And in June, the EU adopted a *Vaccine Strategy* as "the best bet to achieve a permanent solution to the pandemic" (EC, 2020b). The global effort, meanwhile, was funnelled through the COVID-19 Vaccines Global Access pillar of the ACT Accelerator – COVAX. Launched in April, and coordinated by the WHO and two public-private partnerships (Gavi and CEPI), COVAX was geared toward the "research, development and [global] distribution" of vaccines so as to bring "the acute phase of [… the] pandemic to a swift end" (Barkley, 2020).

The development of Covid-19 vaccines occurred at unprecedented speed. In June 2020, a mere six months after the WHO PEIC declaration, Chinese authorities approved the limited use of the CanSino vaccine. In August, the Sputnik V vaccine was approved in Russia. In December, the UK became the first country in the world to approve and administer the Pfizer BioNTech vaccine. International regulatory bodies – the EMA and the WHO – commenced emergency authorizations soon after. As of November 2021, the EMA had authorized the use of four Covid-19 vaccines, while the WHO had approved twenty with a further 132 reported to be in clinical development (EMA, 2021; WHO, 2021b; WHO, 2021d). The pace of vaccination itself paralleled these developments. "The biggest vaccination campaign in history", Bloomberg reported in December 2021, was underway with 8.09 billion doses having been administered across 184 countries (Bloomberg Vaccine Tracker).[1]

Vaccines as a global public good

Efforts to tame the Covid-19 pandemic proceed from the firmly established medical view that infectious diseases are best dealt with through vaccination. One assessment from 2011 suggested that no other "medical intervention has [had] such an unambiguous track record of preventing morbidity and mortality" (Moxon et al., 2011). Gavi noted that in the 2000-2020 period its vaccination programs accounted for approximately 15 million deaths prevented and some 700 million future disability

[1] Data as of 4 December 2021.

adjusted life years averted (Gavi, 2020a: 2). Vaccines have eradicated smallpox and almost entirely eliminated polio. They have also proven vital to controlling *inter alia* measles, diphtheria, tetanus, rotavirus, pneumococcal disease, rabies and hepatitis B.

Given their significance to global public health, vaccines are generally viewed as something that should be universally available. "Equitable access" was the third guiding principle (of six) underpinning the WHO-sponsored *Global Vaccine Action Plan for 2011-2020* (WHO, 2013: 22). The successor WHO strategy, *Immunization Agenda 2030* (adopted by the World Health Assembly in August 2020) lays down "coverage and equity" as its third strategic priority. Priority six – supply and sustainability – meanwhile, asserts the need for "a reliable supply of appropriate and affordable vaccines" and "rapid access in emergencies, outbreaks or pandemics" for those populations dependent on humanitarian aid (WHO, 2020b: 42). That position reflects the norms of human security encapsulated in the Millennium Development Goals and their successor, the Sustainable Development Goals (SDGs) of 2015. These goals – including the third SDG of "good health and well-being" – are, according to the SDG framing document, "universal […] accepted by all countries and […] applicable to all". They "involve the entire world, developed and developing countries alike" – the only qualification here being that collective effort should "endeavour to reach the furthest behind first" (UN General Assembly, 2015: par. 2, 4, 5).

If equitable and universal access to vaccines promotes public health, it is a seemingly small step forward to suggest that vaccines should also be regarded as a global public good (Sachs, 2002: xii). That suggestion does make sense as an ethical position (Jecker, Wightman and Diekema, 2021), but it is not something that follows logically from a vaccine's inherent qualities. Simply put, a vaccine does not meet the two defining conditions of "publicness" – that a good be non-rival and non-excludable (Persad and Emanuel, 2021). The former requires that the use of a good by one individual does not impinge upon the ability of another individual to do the same. The warmth of the sun meets this criterion, but a vaccine does not; once a vaccine is administered it is not available to anybody else. Non-excludability, meanwhile, refers to goods that are, without discrimination, accessible to all; those where there are no barriers to use whether that be through prior payment (which would create a private good) or membership (which would be a club good). Vaccines do not inherently meet these standards. Unlike sunlight, which is non-excludable as well as non-rivalrous, vaccines are rendered easily excludable by price and ability to pay or by demand exceedingly supply. Given these properties, vaccines could only be construed as public goods if their limiting conditions are altered. They need to be plentiful as well as cheap or even free to use (Gavi, 2020b). Such a condition would allow for universal vaccination and with it a significant amelioration of deaths and illness caused by Covid-19. Vaccines are, in this sense, the path to a substantive underlying public good: communicable disease control, which once achieved is of "benefit [to] all people, in poorer and richer countries, present as well as future generations" (Kaul & Faust, 2001: 870).

The language of global public goods

Throughout the Covid-19 pandemic, assertions that vaccines should be treated as a global public good have been commonplace. The context of that claim is Covid-19's global impact and the speed of its spread. Because all nations and all peoples have been vulnerable (by contrast, other late Twentieth Century and Twenty-First Century pandemics were regional in their effects), then so the pandemic has

required a coordinated global response and an attention to all of humanity (Treves, 2020: 22-23). That sentiment found early expression in the call of United Nations General Assembly (UNGA) Resolution 74/274 of April 2020 that "future COVID-19 vaccines [… be] available to all those in need, in particular in developing countries" (UN General Assembly, 2020: par. 2).[2] At that time German Chancellor Angela Merkel and French President Emmanuel Macron referred to vaccines at this time as a global public good as well as a "common human good" (Kahl & Wright, 2021: 297-298). The *EU Vaccine Strategy* suggested that "high-income countries have a responsibility to accelerate the development and production of a safe and effective vaccine and make it accessible for all the regions of the world" (EC, 2020a). Chinese leader Xi Jinping stated similarly that vaccines being developed in China would be "made a global public good" as "China's contribution to ensuring vaccine accessibility and affordability in developing countries" (Wheaton, 2020).

As vaccines came on stream, these positions held firm. The *Rome Declaration* of the May 2021 Global Health Summit noted "the role of extensive COVID-19 immunization as a global public good" (EU Global Health Summit, 2021). In August, the Chinese-sponsored International Forum on COVID-19 Vaccination Cooperation repeated the message and called "upon all parties to step up efforts to make vaccines more accessible and affordable in developing countries" (Embassy of the People's Republic of China in the United Kingdom of Great Britain and Northern Ireland, 2021). The headline goal of the Global COVID-19 Summit hosted by the US the following month was to "vaccinate the world" – with a target of inoculating 70% of the world's population by September 2022 (The White House, 2021). The Asia-Pacific Economic Cooperation (APEC) forum in November (attended by 21 heads of state and government including both American and Chinese leaders) foresaw expanded vaccine manufacture and supply as well as equitable distribution, and expressed the by now familiar commitment to inoculation as a global public good (Perry & Gomez, 2021). As well as supplier countries, vaccine recipients have made similar calls. The Prime Minister of Bangladesh, and the Presidents of South Africa and Argentina, among others, have called for a fair distribution of vaccines across the world (Buenos Aires Times, 2021). This position has, in turn, been backed by a wide range of non-governmental organizations (Action Aid, 2021).[3]

The challenge of public good provision

One early and seemingly insurmountable challenge to the provision of Covid-19 vaccines has already been overcome. Writing in September 2020, Ezekiel Emanuel and colleagues noted that once developed, vaccines would be scarce so compounding the problem of fair access (Emanuel et al., 2020: 1309). In fact, during 2021, vaccines became plentiful. "[V]accine supply", Gilbert and Hatchett noted in October 2021, would "likely soon cease to be the main constraint limiting global vaccination efforts". Global production, they continued, was "nothing short of extraordinary" with the production of 11.6 billion vaccine doses predicted by the end of 2021 (Gilbert and Richard Hatchett, 2021). At the beginning of December 2021, it was reported that nearly 37 million doses were being given worldwide every day. The problem, however, is that vaccines have not ended up being evenly distributed. The world's 52 least developed countries, accounting for 20.5% of global population, had received just 5.2% of vaccines (Bloomberg Vaccine Tracker). And this is a problem that is likely to persist. As the

[2] Sponsored by 179 states.

[3] See, for instance, the appeal of 40 civil society organizations.

scale of vaccine production has ramped up, the need for ongoing vaccination has not abated. Immunity from first and second doses began to wane in the latter half of 2021 and so controlling the pandemic long-term has come to be seen as reliant on the administration of booster vaccines. Two issues have arisen in consequence. The first concerns the trade-off between boosters for well-covered populations and the supply of first and second doses to countries with lesser levels of coverage. Hence, the call by WHO Director General, Tedros Adhanom Ghebreyesus, in August 2021, for a moratorium on booster jabs in wealthy countries, a call repeated with the emergence of the Omicron variant in November. That issue will become less acute as global supply increases (see below). But a second issue will remain – the need, possibly over several years, to administer booster vaccines at a global scale (Dolgin, 2021).

The demand for vaccination against Covid-19 is thus high and likely to remain so. The resulting issue of equitable access has been mitigated (but not resolved) by the development and supply of effective vaccines. However, assertions that vaccines should be considered a global public good have set a high bar for the sponsors of a global response to the pandemic.

Assessing international vaccination efforts

The speed and scale of vaccine development for Covid-19 is without precedent. Governments have made monumental efforts to support this effort. Still, a view persists that political leaders in Europe and America are motivated by "neurotic nationalism", putting the needs of their own populations first and ignoring those of the developing world (Cohen, 2021). Such criticisms are over-blown. They ignore the deficiencies of other major supplier countries (China, India and Russia) and downplay the contribution European and American states (roughly coincident with membership of NATO and the EU) have made to dealing with the pandemic. Below we set out four criteria for assessing contributions to the immunization of the global population:

- *equity* in the distribution of vaccines across populations, particularly between high-, middle- and low-income states;
- the *availability* of effective and safe vaccines;
- the *accessibility* of those vaccines by the global community;
- the *expansion* of production through a relaxation of intellectual property rights (IPRs) and promotion of vaccine-manufacturing partnerships.

Equity

It is repeatedly pointed out that a disproportionate share of the world's available vaccines has been used to immunize the populations of Europe, North America and other countries in the Organization for Economic Co-operation and Development (OECD) (Brown, 2021). But "vaccine equity" as an operational concept remains fuzzy at best. As Thierry de Montbrial points out, "any categorical imperative relating to [equity], even the most ethically convincing, rings hollow in the absence of an international organization with precise, universally accepted rules, and capable of defining strategies and ensuring their implementation" (de Montbrial, 2020). It is also the case, as Anthony Dworkin has

argued, that "European leaders have a particular responsibility to their own populations and cannot be expected to pass up the chance to procure vaccines for their citizens" (Dworkin, 2021). And the same applies to China, Russia and India. In March of 2021, the Indian ambassador to the United Nations (UN) claimed "India ha[d] supplied more COVID-19 vaccines globally than [it had] vaccinated its own people" (The Hindu, 2021). This contribution to ending "vaccine inequity […] and disparity in the accessibility of vaccines" came to an abrupt halt two months later. As Covid cases spiked, the Modi government imposed an export ban on domestically-manufactured vaccines and allowed for the first time the importation of foreign vaccines – a strategy that was good for India, but nonetheless reduced global supply (Elci, 2021).

As well as national investments in the development and procurement of vaccines and the presumption that a government's first obligation is to its own citizenry, the initial distribution of Covid-19 vaccines can be explained simply by reference to need. Seemingly confirming Sutton's Law:[4] vaccines have been delivered where the Covid outbreak has been most severe in terms of cases and deaths per million. As of November 2021, NATO Europe and North America have had the highest number of cases per million (93,993 and 127,873, respectively) and the first and third highest number of deaths per million (1,680 and 2,078, respectively). By way of contrast, sub-Saharan Africa has had 5,400 cases per million and a death rate of 134 per million. NATO states also have among the highest levels of urbanization and the oldest populations in the world, both of which are correlated with infection, hospitalization, and mortality (Brodin, 2020; Rader, 2020). It is worth noting that had the indicators for determining the allocation of COVAX facility vaccines been applied globally (not simply used as a mechanism for distribution to low-income countries) then the developed countries would have been favored (WHO, 2020a: table 1). It should not come as a surprise, then, that 75% of the world's vaccines have been administered in high- and upper-middle income countries that constitute 50% of the global population (WHO, 2021c).

Availability

Vaccines have become available at speed because governments have provided huge subsidies to offset pharmaceutical company start-up costs. Public monies covered approximately 77% of the development costs of vaccines in the UK and provided a further GBP 11.7 billion for their purchase, manufacture, and distribution; Germany invested USD 745 million in CureVac and BioNTech to support the development of a Covid-19 vaccine; the US OWS not only invested USD 19 billion in six major pharmaceutical companies – American and European alike – but signed advanced purchase agreements for 1.2 billion doses (US Congressional Budget Office, 2021: 10-11 and table 1; Schiffing & Breen, 2021; Cross et al., 2021; Smeaton & Harriss, 2021; Blankenship, 2020). By contrast, the Russian Federation invested just over USD 300 million for the development of the Sputnik V vaccine; the Chinese government invested USD 124 million in the state-owned Sinopharma (Sinovac raised USD 500 million in research funds from the private sector); and the Indian government did not invest in vaccine development or manufacturing until the Covid surge in April 2021 (TASS, 2021; XinhuaNETI, 2020; businesswire, 2020; Mudur, 2021; Health Policy Watch, 2021). That public funds have been essential to the rapid development and manufacture of vaccines suggests that the citizens who paid

[4] When the bank robber Willy Sutton was asked why he robbed banks, he replied: because "that's where the money is".

for them (through public taxes) have a legitimate claim to their use. Equitable supply globally, in other words, is not the only measure of judging fair distribution.

Pre-purchase agreements and the hoarding of vaccines in short supply reflects that position, hence the so-called "vaccine nationalism" evident through 2020 and early 2021. Expected increases in supply (see above), however, make it possible for supplier states to both prioritize home populations and meet global vaccination commitments. It is estimated that in 2022 40.37 billion Covid vaccine doses will be produced, a number far in excess of the shots necessary to fully vaccinate a majority of the world's population (UNICEF).

This favorable scenario remains contingent, however, on other considerations. Vaccine efficacy is one problem. Chinese-produced vaccines meet WHO standards but are seen as less effective than those developed in Europe and America (Reuters, 2021; Shepherd & Riordan, 2021). The Russian Sputnik V vaccine, meanwhile, as of December 2021 had still not received formal WHO approval for emergency use. Both Chinese and Russian vaccines, however, remain in the global vaccine inventory. It is thus important to consider the composition and roll-out of global supply – involving all major suppliers.

Accessibility

In developing countries, access to Covid-19 vaccines has been stymied by a number of discrete barriers: poor public health infrastructures; export bans by supplier nations; and the failure of pharmaceutical suppliers to deliver vaccines under contract. Pricing, however, has been key. There is a great degree of variability in the prices charged for vaccines. The Oxford/Astra-Zeneca (USD 4.75 per dose) and Janssen/Johnson and Johnson (USD 10.00 per dose) vaccines are among the cheapest, while the Moderna (USD 21.98 per dose) and Sinovac (USD 18.12 per dose) vaccines are the most expensive (Robbins & Chutel, 2021: B3).[5] EU and NATO states have offset these costs with substantial contributions to international facilities. The Covid-19 Global Humanitarian Response Plan (GHRP) (UN Office for the Coordination of Humanitarian Affairs, 2020: 4)[6] had by the beginning of December 2021 amassed total funding of just over USD 3.7 billion. This was well short of total pledges (USD 56.5 billion) and the USD 37 billion funding requirement for 2021. That said, the US was the major donor by far – having contributed just over USD 919 million in funding and total pledges of USD 43.2 billion. Germany had delivered USD 429 million (total pledges of USD 1.7 billion), the European Commission USD 354 million (total pledges of USD 6.6 billion), the UK USD 251 million and Canada USD 100 million. China, by contrast, had provided a mere USD 26 million and Russia an insignificant USD 100,000 (Financial Tracking Service).

Donations to COVAX show a similar pattern. COVAX was initially a victim of the Trump administration's hostility toward the WHO. That policy was reversed once Joe Biden entered the White House in January 2021. The damage done to the global supply of safe and effective vaccines was minimal owing to the relative scarcity of vaccines available prior to Biden's tenure. Table 2 details the number of doses donated to the COVAX facility as well as financial contributions. The combined contributions of

[5] Moderna, however, recently reached agreements with the African Union to sell 110 million shots at a price of USD 7.00 per dose and with COVAX for 210 million doses at USD 10.00 each.

[6] This initiative is formally under the aegis of the UN Office for the Coordination of Humanitarian Affairs and was established in March 2020 "to address the most urgent humanitarian health, protection and socioeconomic needs caused by the pandemic".

NATO and EU states account for almost 96% of the total vaccine doses contributed and just over 83% of the financing. Neither China, India nor Russia has donated vaccines to the COVAX mechanism and China has only contributed USD 100 million in cash – a figure leaving it in 30th place out of 60 contributing countries.

Table 2: Contributions to COVAX (Our World in Data, 2021; WHO)

	Doses Donated	Global Share	Financial Contributions (USD millions)	Global Share
Team Europe	836,900,000	45.18%	5,183	31.57%
EU	345,550,000	18.65%	617	3.76%
France	120,000,000	6.48%	335	2.04%
Germany	100,000,000	5.40%	2649	16.14%
Italy	45,000,000	2.43%	493	3.00%
UK	100,000,000	5.40%	1109	6.76%
Canada	40,800,000	2.20%	1,101	6.71%
United States	800,000,000	43.18%	6,309	38.43%
Others	74,800,000	4.04%	2,713	16.53%
China	0	0.00%	100	0.61%
Russia	0	0.00%	0	0.00%
India	0	0.00%	0	0.00%
TOTAL	1,852,500,000		16,415	

Two other indicators paint a similar picture: the global share of bilateral sales and bilateral donations of vaccines, and meeting the WHO's "fair share" funding benchmark. As of October 2021, NATO states had bilaterally donated almost 151 million vaccine doses (46%of total global donations), while China had donated 23 million doses (6.90% of the global total), India 11 million doses (3.27%) and Russia just over 1.1 million (0.04%). Combined, pharmaceutical companies in NATO states had also sold 9.53 billion doses (74% of the global total), while China had sold 1.131 billion (8.85%), India 310 million (2%) and Russia 445 million (3.45%) of the global total. NATO states had supplied jointly 62% of the total number of bilateral doses sold or donated, whereas China, Russia and India were responsible for 16.6% and 0.65% respectively. The Chinese, Indian and Russian performance in terms of meeting the "fair share" donation to the ACT-Accelerator for 2021-2022 has been similarly poor: neither Russia nor India had pledged any financial support and as of October 2021 China had pledged just 3% of its benchmark contribution. This contrasts with pledges against benchmark of 140% by Sweden (the first

ranked state), 132% by Germany, 126% by Norway, 109% by Canada, and 69% and 64% respectively by the UK and the US. In fact, by this measure, eight of the top ten donors were American or European (Saudi Arabia and Kuwait being the exceptions). China ranked 29th (Duke Global Innovation Centre; WHO, 2021a).

Such figures suggest headline Chinese announcements need to be treated with caution. Addressing the Forum on China-Africa Cooperation in late November 2021, President Xi claimed that China would provide one billion vaccine doses to African countries in 2022 (with 600 million as donations) (Mcallister & Daly, 2021). Chinese vaccine manufacturers are clearly capable of producing at scale. Beijing only permits Chinese-made Covid vaccines for domestic use and as of early December 2021, 2.52 billion doses had been administered. Global sales of over 1.1 billion are also clearly impressive. But China's small donations to date, whether via COVAX, the ACT-Accelerator or bilaterally, suggest commercial considerations could well be trumping humanitarian concern.

Expansion of production

Despite the significant ramping up of global vaccine production, calls have been made to facilitate greater production in developing countries. A "hoarding of knowledge", some have argued, stands in the way of producing "at scale the diagnostics, therapeutics and vaccines needed to fight the pandemic" ('t Hoen, 2021). The WHO COVID-19 Technology Access Pool (C-TAP) proceeds on the assumption that such shared knowledge will allow local drug companies to manufacture and distribute vaccines and therapeutics (Geiger & McMahon, 2021: 2-4). The Indian and South African governments in October 2020 and May 2021 brought formal requests to the WTO for a temporary suspension of IPRs for "health products and technologies" related to the Covid-19 pandemic. By October 2021, some 100 countries had lent their support to the proposal (still well short of the 164 members of the WTO needed to obtain a consensus decision). This included China and Russia, and (with respect to vaccines only) the US. The measure did not, however, attract the support of the EU negotiating bloc or the UK. By the time of the scheduled WTO ministerial meeting in late November 2021 (cancelled because of concerns over the Omicron variant) no agreement had been reached.

In the absence of IPR waivers, the way is still open for the major vaccine producing companies to open licensed production facilities in developing countries (Kuper, 2021). Progress here has been mixed. Bharat, the Indian producer of Covaxin, lacks any bulk manufacturing agreements outside India. China's Sinovac and Sinopharm have signed operative bulk production agreements with Indonesia and the United Arab Emirates. Gamaleya, the producer of the Sputnik V vaccine, has signed agreements with five countries (including Brazil, Kazakhstan and India) with a manufacturing capacity of 738 million doses annually. Oxford Astra-Zeneca, meanwhile, has bulk manufacturing agreements with nine countries to produce 1.52 bn doses of vaccine. The other major vaccine producers have signed multiple bulk manufacturing production agreements, usually with firms located in the OECD area. This focus has not precluded Western initiatives in less developed countries. The American, French and German governments launched a joint initiative in mid-2021 worth EUR 600 million to produce the Janssen/Johnson and Johnson vaccine in partnership with Aspen Pharmacare in South Africa. Similarly, Moderna announced plans to invest in USD 500 million on a fill and finish facility that will be based in either Rwanda, Senegal or South Africa (US Mission Italy, 2021; Mason & Fick, 2021).

Conclusions

In one of the more alarming arguments on the Covid crisis, former Portuguese Secretary of State for European Affairs Bruno Maçães has suggested that global pandemics serve as a "functional equivalent" to great power war, hastening the transition from American to Chinese hegemony (Maçães, 2021: 70-71). That view we think is misplaced. China has made great play of its credentials as a global citizen during the pandemic but if it has won influence it is through similar means to those already on display with the Belt and Road Initiative – sweeping promises of assistance behind which lurk essentially commercial and political considerations (Keanten, 2021).[7] Governments and pharmaceutical companies in Europe and America may not be free of such calculations themselves, but their record of vaccine supply and related donations casts them in a much more favorable light than their Chinese (and, indeed, Russian and Indian) equivalents. International order may well have been upended by Covid-19, but it should be acknowledged that the EU and NATO powers have endeavoured to formulate and execute normatively consistent policies and resisted the temptation to retreat into parochial self-interest and an abandonment of their global responsibilities.

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[7] More malign behaviour has also been in evidence. It was reported in June 2021 that Ukraine withdrew its signature from a statement at the UN Human Rights Council on the treatment of China's Uighur population following threats by Beijing that it would suspend deliveries of the Sinovac Coronavac vaccine.

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WORKING GROUP REPORT

INTERNATIONAL COOPERATION TO ADDRESS PANDEMIC

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The scope and the pace of diffusion of the undergoing SARS-COV-19 pandemic seem a confirmation of the truism that wants magnified cooperation as inevitable in a globalized world. Truly, this assertion is hardly disputable if one looks beyond the health sector to the many disruptions caused by "go it alone" policies. Moreover, the assertion that cooperation might ward off, assist to cope, and make up for the effects of (very likely) future pandemics has no true contestant of late, not even among those actors most fiercely opposing any external intrusion in own affairs. No border would suffice, for the virus would spread anyway, sooner or later.

However, how to reach such scale of cooperation and under which terms is far from ascertained. Covid has uncovered a pandora box of unanswered and unresolved issues stored over the years for everyone to wonder about and one has only spoiled for choice where to start from. Are IOs to gain more independency in the global landscape? Is health a public good and who is going to provide such public good? Do we all share a meaning of public good or is health instead a club good mastered by the most powerful actors to score yet another point in their strategic game? Is crisis a trigger for more integration and if yes how to exploit the moment? Is the securitization of health a risk to avoid or a quasi-normative prescription to keep an eye on the potential consequences of health disruptions? These and more issues were brought to discussion among participants of WG 1, whose composition ranged between scholars, analysts, and practitioners.

The debate was rich and fruitful, nuanced at times with different positions and articulated in three phases: a first aimed at presenting the evidence of cooperation on the pandemic among states and different organizations; a second delving into possible and likely developments in addressing health and health-related issues; a final one speculating about the role of NATO with a view to possible future health emergencies. Overall, three main questions have respectively guided the three-pronged debate:

1. What type of challenge are we facing? Which strategies have been put in place to cope, by whom? What has been missing?
2. What role (if any) has NATO played to marginalize the effects of the crisis? Which the rationale behind its action? How good was coordination with other actors?
3. What could NATO do in the case of a future pandemic? Should it have any role at all?

Next three sections regroup most of the arguments raised and the conclusions reached in each of the phases just presented.

A truly global challenge

As reiterated many times during the Academic Conference, Covid has caught us as profoundly vulnerable. Vulnerable in a literal sense, for Covid impacts our health but also in many other ways: in our ability to act according to largely predictable warnings; in our surveillance and alert systems; in preparedness and response and in grasping the real magnitude of the challenge at stake. The stance has been reactive at best and the gloomiest part of the argument is that its long-lasting consequences have only begun to be sensed and stretch out to touch economic, security and social dynamics to name but a few. Covid is truly a global challenge that has tested, and will continue to do so, our capacity at collective action.

As pointed out in the discussion, the immediate reaction has been slow and inconsistent, characterized by the lack of assertiveness and enforcement mechanisms, insufficient funding and personnel, limited and belated decision-making in relevant institutions (the WHO foremost), mistrust among actors on many levels and contradictory communication diffusing among people a layer of scepticism towards experts and actors in charge. Among the first to be hit by the pandemic, the EU's answer has been scattered at best. If past epidemics such as SARS had favored the creation of the ECDC and talks on serious cross-border threats, in the case of Covid-19, poor implementation of existing recommendations by member states, travel bans and divergent data collection systems (if any) have all contributed to make the toll particularly high.

A second moment during the height of the crisis in 2020 has displayed more positive stories, with better understanding of the overall situation and its broader ramifications and the fast development of a vaccine. The issue of vaccines, their production and distribution occupied central stage in the debate within the WG as this new scientific outburst is thought to be the main instrument in the journey from crisis to normality. As we are moving from shortage to plenty of vaccines, though, many other problems come to the surface, it was noted. A crucial issue is the one of vaccines provision: international leaders loudly spoke of vaccines as a public good but participants soon identified two sets of challenges there related. First, are vaccines really a global public good? And more preliminarily, what is the understanding of public good as used by world leaders? The assertation that vaccines are public goods reasonably creates expectations about their delivery for free and in sufficient amounts to reach everyone, clearly a normative point. If actions do not match words, this has the potential to create a major political problem, let alone a health one. If publicness is valuable, and if we assume that certain countries seem better positioned to contribute to vaccines production, the issue then is one of both leadership and responsibility and directly questions the West's role in the current lack of equitable and fair access. Building on that, the understanding of public good seems far from shared: the debate has underlined how vaccines have been provided by China under payment (if moderate) and through bilateral relations. More to that, vaccines production and provision then seem to be yet another stage in superpowers competition, as the wording "vaccine diplomacy" clearly suggests. The issue of vaccines production solicited other reflections: the debate lingered on how far to go with respect to the WHO's Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) waiver option. Here the WG reckoned that a careful assessment of the different phases of production, distribution and technology diffusion had to be considered. In fact, many critical issues could be raised on the profitability of completely relaxing production and technology protection restrictions.

Overall, it was largely acknowledged that for the discussion to be of use a talk on what is feasible rather than what should ideally be achieved would serve more the cause of rethinking international cooperation on global health challenges.

Coping with the pandemic: NATO's role

Faced with uncharted cooperation patterns, the current governance of Covid has clearly shown problems on many fronts as seen above. Available organizations have tried to cope with the instruments at disposal and the margin of manoeuvre them accorded. Among these, NATO has offered a valuable contribution. Precisely because of this and with a view to better decipher its role *vis-à-vis* upcoming challenges to the Alliance, the WG has examined NATO performance during the pandemic. The debate has highlighted three key points.

First, NATO has provided a visible contribution in general and with respect to specific geographical contexts. The immediate concern has been ensuring the safety of troops on the ground and the smooth running of ongoing operations and activities. The supportive task of NATO, as dubbed, has regarded logistics, air-lift, the deployment of field hospitals, transportation of medical tool and staff among others. Thanks to its chain of command, which serves the purpose of fast mobilization, NATO's contribution has been concrete not only in members but also in partner countries, whose calls have been promptly received.

Second, NATO-EU cooperation has been particularly fruitful. On the assistance side, the EADRCC and the NATO Support Procurement Agency have proved useful tools for coordination and for information sharing. More to that, though, as it has been pointed out, informal talks have explored the key aspects of countering mis- and disinformation about the nature of the pandemic and the mechanisms to cope and to ward off the risk that critical infrastructures may be subject to cyber attacks.

Third, NATO involvement may have exerted positive effects for the same organization. Some participants have highlighted that the pandemic may have re-energized NATO self-confidence by showing members that investments in security and defence are worth paying. Furthermore, NATO usefulness may have played as a trust-builder in a time when the direction to go and the role to perform is unclear to states.

If there was no denying of the considerable work of NATO and of its urgency scant of alternative tools, most of the discussion was centred around the possible "normalization" of NATO role in future health challenges. Hence, the next section presents main positions and arguments emerged.

Fit for the purpose…or not?

Envisaging NATO as an active actor in future challenges has required a close scrutiny over the possible problems such an occurrence might cause. Two main concerns were mainly academically driven, one was decidedly more practical and the last one stood in between. All of them made for a rich, variegated and insightful debate in the WG.

The opportunity of NATO's involvement was at first evaluated within the broader issue of civil-military cooperation. Indeed, the military sector has been a constant presence in the governance of the pandemic, spanning from NATO to national resources. But wondering whether NATO should play a role in the future requires answering to two preliminary questions: has NATO stepped in because it is better at performing some functions? Or instead to fill gaps? The answer stands most likely in between; however, the two inferences imply different arguments and reasonings. In the first case it is possible to imagine a role for NATO in the future, one that is interoperable with other governance tools and that is displayed when asked for. In the second case, instead, participants agreed that there is a major health issue at the basis that has to be fixed, with all related components and consequences. That is, the civil sector has to catch up soon.

Somehow related to the concern of NATO intrusion in a field that is not its own was a second concern, that of the potential securitization of a non-security issue. Engaging NATO would stir the concern of those fearing that appropriate forum of discussion is diverted from "health" to somewhere else, with fundings following suit. If we proceed in tasking the military, the next crisis is going to be coped with differently, has been pinpointed by some. Also, a pertinent suspicion regarded the consequences of a security framing on transparency and democratic practices, on legitimacy and accountability, as evidence from other securitization processes has made clear. Not all participants, though, were skeptical of "bringing security in": perhaps, a distinction between militarization and securitization, was suggested, could better serve the cause of edging different domains while keeping an eye on potential security repercussions of global challenges.

On a more practical level, it was suggested that NATO's involvement in health crises might in fact overstretch its capacities, drain resources and take them out of core and urgent domains/situations. NATO cannot defend everything was repeatedly affirmed during the Conference. As NATO has already a lot in its plate, diversion of personnel, tools and efforts in general (its sustainability) may be more counterproductive than beneficial to the Alliance.

A final concern raised was one reflecting on the scope of the possible NATO intervention. In the end, NATO remains a "regional organization", whose reach is limited to membership and partnership. This somehow resonates with the discussion presented above about the mismatch between the comprehensiveness of the challenge and yet the imagined "divisibility" of the solution (only illusory given that limited geographical "freeness" would be useless). Here relevant questions involve ethical considerations on top of effectiveness ones, but equally worth considering for soliciting true international cooperation.

Concluding remarks

The pandemic does not end with health, it is multidimensional and stirs effects on many fronts which accordingly require the engagement of many actors beyond the health domain. From a global R&D effort on vaccines to the necessary supportive role of financial structures (WB, IMF and others) a comprehensive approach should be put in place to cope but mostly to prevent or fast marginalizing upcoming global challenge. Given the fact that, as remarked by experts in the WG, the likelihood of new pandemics between

now and 2030 is a matter of “when” rather than “if”, reflection and action can no longer be deferred. The question of “who is calling whom” is to have a prompt answer.

NATO has indeed some tools and instruments that could be useful especially in coordination with the EU such as those activated during the height of the Covid-19 crisis: ultimately, this would allow to reach Allies and partners which for example are NATO but not EU members. Large agreement was shown on the fact that no new policies or crisis capabilities are to be produced: the task should be specific, limited and on demand. This seems to fit well with NATO’s current stance of no intention to expand or enter foreign fields.

However, this is no invitation to disregard how the social, economic and security situation evolves both for Allies and partners: no matter which challenge they have been caught under, their resilience should be always closely monitored, a task that NATO intends to absolve. As a matter of fact, a collapsing health system may be more easily and more seriously pray to cyber attacks; an economic downturn may cause further instability with impact on security looming large. Also, an ancillary but key NATO’s role is that countering mis- and disinformation to avoid that a future pandemic is used, as it was under Covid-19, for strategic purposes. As it was reminded, interdependences created during moment of particular strain are hard to be dissolved afterwards.

(Photo credit: EPA, Tannen Maury)

WORKING GROUP
II

RESILIENCE AND SECURITY OF GLOBAL SUPPLY CHAINS: THE POLITICAL ECONOMY OF THE RESPONSE TO COVID-19 PANDEMIC

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Abstract

The dramatic pandemic that has hit the planet since early 2020 is having important implications for the global economy and its governance, as well as for national security. From the very beginning of the health crisis, trade, investment and the functioning of GVCs were affected, as evidenced by shortages of critical inputs, plant closures, imbalances in major shipping routes, and seafarers' displacement. In other words, Covid-19 has made it crystal clear that pandemics are inherently global phenomena, that travel fast and do not stop at national borders. Insofar as they generate cross-border externalities, they also require international cooperative solutions.

Confronted with these scourges, countries should seek to reinforce mechanisms of international cooperation and governance institutions that support the fight against global "common bads", in various policy domains. They should *a fortiori* adopt this approach when one considers the degree of interconnection of economies and societies, which is of various degrees of magnitude higher than 100 years ago, when the Spanish Flu ravaged the world. Little of this happened, however. In response to the cross-border spread of the infection, governments acted overwhelmingly local and were driven by national considerations. Lockdowns, social distancing measures and travel restrictions, as well as new trade and investment barriers, while all claiming to be guided by the same science, varied widely in their severity and duration.

This has been particularly evident in GVCs management. While during the great trade collapse in the aftermath of the 2008-09 global economic and financial crisis, "trade within international supply chains [was] more resilient than other trade" (Altomonte & Ottaviano, 2009), this time the opposite happened. In early 2020, shipments of materials and intermediary inputs came to an abrupt halt (see for exemple Hayakawa & Mukunoki, 2021 on machinery goods). Such disruptions in turn have impacted on economic security and international relations.

This paper analyses the response to Covid-19 in terms of domestic and international political economy. It identifies and summarizes a few issues which are relevant to understand opportunities and limitations of

[1] The author thanks Alessandro Marrone and Francesco Moro for their useful comments. The opinions expressed and arguments employed herein are solely those of the author and do not necessarily reflect the official views of the OECD, NATO or their member countries.

international cooperation to govern GVCs during a pandemic. The relationship between each factor and GVC cooperation is sometime loose and sometime tight, but it does hold across the board. It is important to underline that the paper does not specifically address the ongoing disruption of many supply chains caused by the unexpectedly rapid recovery and its effects, in particular in terms of inflation surge.

The main arguments can be summarized as follows:

1. The response to the pandemics in trade and investment policies has been largely national or at best regional, driven by the immediate need to guarantee the security of supply, rather than any long-term strategy of building resilience into GVCs. Nonetheless, populism and isolation have not prevailed, as evidenced by elections held since spring 2020.
2. When the stakes are so high, policy-makers must be wary of existing legislation (in the case of Covid-19 and GVCs, those on patents in particular) and be ready, flexible and proactive in using the many legal tools and loopholes that are available. In other words, a crisis makes it possible to interpret, or even mend, rules to check their harmful use and/or to promote their innovative use, although the political resources needed for doing so are non-trivial.
3. Covid-19 further strengthened South-South cooperation and made manifest that it is almost impossible to understand global economic affairs without paying attention to the interests of the Global South and of the BRICS[2] in particular.
4. The G20 has acted rapidly in trying to mobilize international cooperation and minimize GVC disruptions, at least in terms of political directions. It has thus confirmed its status of firefighter, although it suffers from its compartmentalized nature (and in this it simply replicates the government structure) and the difficulty in finding a common ground among its members and their interests when it comes to implementation.
5. UN specialized agencies, which are very often considered outdated and inefficient institutions, do in fact play an important role in greasing the GVC wheels through their normative and standard-setting activities. As a consequence, the process to appoint their top management has acquired a new centrality and is emerging as a new field of confrontation between the US (and the West) and China (and parts of the Rest, see Amsden 2001).

Policy responses have been largely national

Global production, investment and trade follow complex routes through hubs and spokes. Two examples taken from *The Economist* manage to convey this phenomenon: Apple's manufacturing network straddles 49 countries, while Pfizer has more than 5,000 suppliers (The Economist, 2021). In their quest to maximize efficiency, multinational enterprises have sought to specialize and to concentrate particular tasks in places that offer economies of scale. The result is that for 180 traded products (worth USD 134 billion in 2018) a single country accounts for the vast majority (i.e., 70% or more) of exports (MGI, 2020). For instance:

[2] The acronym "BRICS" stands for the group of countries encompassing Brazil, Russia, India, China and South Africa.

- China exports 94% of an antibiotic used to treat conjunctivitis, meningitis, typhoid fever, and other serious infections;
- Japan exports 76% of cyclohexanol, a chemical used for paints, plastics, and varnishes;
- China exports 74% of personal laptop computers;
- Germany exports 53% of machine tools for heavy material machine operations.

The pandemic and associated geopolitical tensions raised worries around the incompatibility between seeking efficiency through well-organized, low-inventory supply chains, ensuring their robustness and security to shocks, and maintaining the liberal order.

The response in most cases has been to get "vocal for local", i.e., to promote resilience and self-reliance, also through protectionist measures. As a matter of fact, most governments have moved in that direction through diagnostics and analyses, postponing real action to a later date. Still, over 140 special trade restrictions were enacted between April 2020 and April 2021 and many countries have tightened their screening of foreign investment, even if that carries the risk of weakening the multilateral trade system and its institutional pillars such as the WTO dispute settlement mechanism. One can also argue that the newly-found sympathy for taxing tech giants abroad and imposing levies on carbon-intensive imports, following years of benign neglect, corresponds to governments' temptation to take matters into their own hands.

In the case of "strategic" supply chains, going "vocal for local" has taken different forms. In February 2021, President Joe Biden's Executive Order 14017 ordered a 100-day supply chain assessment for four critical products: semiconductor manufacturing and advanced packaging; large capacity batteries, like those for electric vehicles; critical minerals and materials; and pharmaceuticals and active pharmaceutical ingredients (APIs). One month later, the European Commission said it would double the EU share of world chipmaking by 2030, to 20%, which followed a pledge to be self-sufficient in batteries by 2025. Various member states have introduced sweeteners, in particular tax benefits, to accelerate "re-shoring" of manufacturing activities that were delocalized to Asia and Central Europe in recent decades. Xi Jinping's "dual circulation" concept, launched last year, aims at insulating the Chinese economy from outside pressure. A vast array of policy measures has been taken to vertically integrate production and achieve self-reliance, including the revision of the Catalogue of Technologies Prohibited or Restricted from Export, the enactment of anti-sanction legislation, and restrictions on both inward and outward portfolio investment.

Such pledges are vague, but the preference for domestic jobs and manufacturing and promise of subsidies could mark a point at which the world shifts away from free trade and open markets. Nonetheless, there seem to be some indications that in the contest between nationalist isolation (symbolically exemplified by Trump's America First slogan) and globalism (the expectation that maintaining open borders is the better defense against sudden shocks) solidarity – the latter has prevailed so far. Elections in 2020-21 have been disputed on numerous issues, but there can be no doubt that the approach towards globalization and GVCs was a crucial one. Against this background, it is important to underscore that in G20 countries that have gone to the polls since mid-April 2020, the winners have prevalently embraced a mild version of globalism and nowhere have outright protectionist candidates won.

GVCs rules can be suspended

Developing countries have been much more vulnerable to the pandemic than developed ones, given significant differences in underlying economic conditions such as higher levels of informality, scarce diversity in the formal economy, and the heavy reliance on external markets and sources of finance. In addition, they were negatively hit by many developed countries' early decision to close their borders to foreigners and then to hoard vaccines (two-thirds or more of the available doses have been pre-purchased or otherwise secured by developed countries). As such, from the very beginning developing country economies were expected to recover much more slowly than those of developed country peers.

Unless international cooperation manages to overcome the roadblocks on this front, the world risks prolonging the pandemic by creating a two-tier vaccine system. The arguments for showing solidarity are in essence two. The first, altruistic argument centers on the moral obligation to help the most vulnerable, as the UN Secretary General highlighted in his call to consider the pandemic a global public good.[3] The second, utilitarian rationale builds on the fact that failure to eradicate the virus from the face of Earth leaves a risk, however small it may become over time, of a resurgence of Covid-19 in the future. It is in the world's interest to suppress transmission everywhere at the same time and reach global herd immunity.

In the initial stages, there were shipments of pieces of protective gear, tests and training materials for health-care workers. This was at the core a race for influence, which pitted China (and to a lesser degree Russia) against the West. But these were simple skirmishes: at the crux of the matter there are vaccines and the progress in achieving equitable vaccines access and delivery for low and middle-income countries. Once more, the 2020-21 pandemic put under the spotlight the complex relation, and indeed the trade-offs, between pursuing collective goals (in this case, protecting public health) and upholding private prerogatives (in this case, protecting IPRs, but also more broadly the freedom of business to choose whom and when to sell). On the one hand, the exclusive rights to the new technologies that patent law grants to inventors encourage invention. On the other hand, patents, as monopoly rights, can also block others from using these inventions, even when those other uses may be the key to stopping infections and saving human lives.

In the early 2000s, as millions without access to treatments died of AIDS, WTO members clarified that countries have "flexibilities" to issue compulsory licenses for medicines. After the 2001 attacks, bio-terrorist made what the intelligence considered credible threats of anthrax attacks and Bayer, which held the patent to the only approved anthrax treatment (ciprofloxacin), claimed it needed 20 months to meet the government-estimated requisition for the drug. Using section 1498 of the US Code Title 28, allowing it "to appropriate any invention necessary or convenient for natural defense or for beneficent public use, … without previous arrangement or negotiation with the owner", the federal government prevailed over Bayer (see The Economist. 2001). Canada's health ministry, too, commissioned a generic drug company to make a million doses of ciprofloxacin for the national stockpile.

Technology transfer/technical coordination has taken place since the very beginning of the pandemic. The best example to highlight this is that the current crop of approved vaccines was developed within 12

[3] See in this regards Sperling & Webber's chapter "Vaccines for Covid-19: a case of global public goods?".

months, instead of 10 years as is usually the case. Additionally, the world's biggest patent offices in China, Europe, Japan and the US have provided open access to patent databases, including medicine search and patent analysis, to enable scientists to monitor state-of-the art innovation and develop it further.

Compulsory licensing, however, has proved to be much harder. More than 100 countries support a temporary waiver of some aspects of the TRIPS. If this is not forthcoming, a compulsory licence may be authorized on public health grounds to enable the generic version of patented vaccines to be manufactured and sold, without the patent holder's consent, on a non-exclusive basis, on payment of royalties (Article 31) (Hu, 2021).[4] Referencing Article 64.2 of TRIPS, the President of Costa Rica sponsored the C-TAP. It was established under the auspices of the WHO to compile, in one place, pledges of commitment made to voluntarily share technologies needed to address the pandemic. At end-2021, not a single vaccine originator has adhered.

Drug companies' argument in battling the waiver – that existing compulsory licensing rights are sufficient – is undermined by their building "thickets" of intellectual property barriers, comprising exclusive rights to industrial designs and undisclosed data, such as trade secrets and test data, in addition to numerous patents and copyrights for each medicine. Each element would require a license, and the WTO's flexibilities might not even encompass all of them. This predicament leaves relatively little room for cooperation, even between like-minded countries (Hollande, 2021), when powerful industry lobbies limit the compromises options.

South-South is increasingly important

Cooperation among countries of the South, far from being a new phenomenon, dates back to the 1960s and the most intense phase of the Non-Aligned Movement. In the Twenty-First Century, however, it has gained new momentum as the BRICS and other large emerging economies came to represent the Global South, with more assertive policy interests and more ambitious political objectives. The United Nations Conference on Trade and Development (UNCTAD) notes that in recent years, South-South cooperation has "gone beyond the traditional aid agenda" to include a variety of cooperation modes in finance, investment, trade, and infrastructure construction, as well as mutual learning and capacity-building initiatives. Examples of GVC-relevant South-South initiatives include "southern liquidity funds" that can help address emergency balance of payment needs and export-import banks that enable countries to engage in intra-regional trade.

The health emergency also made policy-makers recognize the potential for "countries of the South … to build a strategic partnership" that translates to common positions in international affairs that yield more

[4] "Compulsory licensing is used more frequently than is commonly assumed. Between 2001 and 2016, for example, 176 instances of its possible usage by 89 countries were identified, covering products to treat 14 different diseases. The decision laid down by the German Federal Court of Justice in Merck Sharp and Dohme v. Shionogi (2017) upheld the authorization of a compulsory licence and illustrated that the "public health" argument can be applied even to a relatively small group of patients for potential health risks. Since the outbreak of the pandemic, many countries have amended their legislation to facilitate compulsory licence application. Israel, Hungary, Russia and Ecuador have in effect authorised compulsory licences for COVID-19 treatments and vaccines."

inclusive global governance (UNCTAD, 2020). Covid-19 has revealed the importance of health cooperation and scientific research for human welfare and pharma supply chains. South Africa's Aspen Pharmacare and the Russian Direct Investment Fund (RDIF) are already making Covid-19 vaccines. China has been very active in offering assistance to other emerging economies and developing countries, including through trade finance for scaling up its own export of drugs, medical products and other essential needs. It has done so for a complex variety of interdependent reasons, going from a genuine sense of solidarity to badly-disguised economic motivations.

In addition to numerous political declarations calling for medical discoveries to be shared widely, BRICS leaders have devoted considerable time to discuss GVCs in their most recent gatherings – at least as this is reflected in Summit statements. In Moscow 2020, they included "developing appropriate supply chains for industrial and agricultural goods and minimizing disruptions to them" among their "policy priorities [that] go beyond the immediate objectives to minimize the COVID-19 implications" and "reiterate[d] the importance of open, stable and secure global markets and acknowledge the building of more resilient GSCs for increased production of critical health, food and other industrial and agricultural products at the national level and in [their] respective regional contexts, consistent with WTO rules" (see XII BRICS Summit Moscow Declaration, 2020). One year later, in Delhi, references were far fewer, although one important paragraph centers on "the promotion of an open, secure, stable, accessible, and peaceful ICT [Information and Communication Technology] environment" which is obviously relevant for developing efficient GVCs (as well as other goals) (see XinhuaNETI, 2021a).

The G20 proved capable of acting

The current pandemic is the first global health crisis to happen since the 2009 Pittsburgh summit when the leaders officially designated the Group of 20 as "the premier forum for international economic co-operation". Obviously the jury is still out on whether the G20 has lived up to promises and expectations. A preliminary and very tentative assessment suggests that the G20 was relatively swift in its initial response: on 23 February 2020, Finance Ministers and Central Bank Governors included the briefest of mentions in their communiqué (see G20 Finance Ministers and Central Bank Governors Meeting, 2020), but by 6 March they were arguing for "sharing information, assessing needs and devising policy options that countries can implement in response to COVID-19 outbreak" (see G20 Finance Ministers and Central Bank Governors, 2020). Nonetheless, the 2020 G20 Riyadh Summit, held virtually on 21-22 November, "did just enough to hold out hope that the world get through its immediate crises of COVID-19, economic recession and soaring developing country debt for the next few months" (Kirton, 2020).

Italy in 2021 was a more committed chair, as could be expected by a manufacturing economy that occupies a much more central role in GVCs than Saudi Arabia. At the Rome Summit in November, according to the final declaration, Leaders acknowledged upfront that the pandemic "disrupted global supply chains" and then committed to "remain vigilant" and to "work together to monitor and address these issues as our economies recover and to support the stability of the global economy". Still, one is hard pressed to find how the G20 intends to "strengthen supply chains and expand and diversify global vaccine manufacturing

capacity at local and regional level", or guarantee "reliable, responsible and sustainable supply chains of critical minerals and materials, as well as semiconductors and related technologies".

There is some truth in the observation that "the G20 has become the central, increasingly successful, global governance institution, capable of handling the unprecedented, interconnected crises we face today" (Kirton, 2021). The chequered success of Italian Prime Minister Draghi notwithstanding, the truth remains that G20 should adopt "transversal" policy-making, in order to build the institutional and thematic synergies that coordinated multisectoral strategies that reduce policymaking silos. In other words, it was a small, short-term success, but could not hide the fact that the complexity of the Covid-19 requires innovative institutional responses.

Rather than the final nail on the coffin of globalization, Covid-19 may turn out to be an opportunity for reforming components of the international system. In fact, the sore point has rather been that issues of resilience and security did not gain the necessary prominence and therefore little progress has been made to improve data collection and sharing, let alone in including epidemiological and immunological phenomena.

UN agencies do matter

The predominantly Geneva-based UN specialized agencies are little known and – with the notable exception of the WHO – are generally considered to be marginal in the elaboration of global economic rules. However, to the extent that the UN is universal in membership (with the notable exception of Taiwan), the UN system is also legitimate, in fact it is the only international organization which can aspire to unbridled legitimacy. And therefore it is the forum where a new international order can rise, composed of treaties and resolutions concerning the political sphere, but also of much more technical norms and standards. In fact, UN agencies do contribute to shape globalization and GVCs in particular: relevant examples include the Patent Cooperation Treaty of the World Intellectual Property Organization (WIPO), the Universal Postal Union (UPU)'s system for setting international postal rates, known as "terminal dues", and the Maritime Labour Convention of the International Labour Office.

Chinese diplomats have worked in such bodies to align international norms or global rules with their country's version of state capitalism and development policies. The relationship between China and the UN is indeed strong, built on the notion that – as President Xi Jinping expressed it in his 2021 General Assembly address – "we need to build a new type of international relations based on mutual respect, equity, justice and win-win cooperation" (see XinhuaNETI, 2021b). Moreover, in mid-2021 Chinese nationals headed four UN specialized agencies, while no other country leads more than one. This explains the intense lobbying that Beijing has done to support the candidacy of Wang Binying as WIPO Director-General, although she was ultimately defeated by the Singaporean, Washington-backed rival (see Ge, 2020).

Washington and others chanceries have paid growing attention for the peak appointments at such institutions. Peter Navarro, assistant to the US president for trade and manufacturing policy has extensively written on China and UN institutions, UPU and WIPO in particular (Navarro, 2019 and 2020). But already in 2015 the US Postal Service Office of Inspector General researched terminal dues, with a particular focus on

the China to US corridor, to examine concerns and assess the impact of terminal dues distortions in the international small package market – a crucial component of GVCs. During the pandemics, it is the WHO and its Ethiopian Director-General Tedros Adhanom Ghebreyesus that have received unprecedented attention[5]. American right-wingers, and Trump *in primis*, have accused the WHO of being far too late in declaring the spread of the virus a global health emergency. In more sober terms, other Western countries have also been critical. Indeed, during the period of inaction (i.e., January 2020), Dr. Tedros visited China and praised the country's leadership for "setting a new standard for outbreak response" (WHO, 2020).

The pharma supply chain suffers from inherent cracks and lack of data visibility, especially but not exclusively in emerging economies, which jeopardize the proper functioning of the health system, leaving people who receive its services vulnerable and without access to potentially lifesaving medicine. The WHO, through the IHR, a legally binding treaty adopted at the World Health Assembly, occupies the ideal place to build such necessary transparency, Unfortunately, it faces structural problems which do make the organization vulnerable to misinformation and political interference.[6] In no small part, they are due to the limited power the WHO has to compel countries to take action or share information. Kavanagh and Pillinger (2020) argue that "revision of the [IHR] is the venue to accomplish the Trump administration's stated goal to speed information sharing and pressure recalcitrant governments".

Giving the WHO greater powers to gather and share outbreak information without the permission of member states and to review the quality of "official" data would in the end make it easier for actors along the pharma supply chain to plan ahead.[7] As a matter of fact, even *The Economist*, which is usually very critical of large public bureaucracies, acknowledge that the organization's response to Covid-19 has been rather swift.

> "At the start of the outbreak officials worked with technology and social-media companies to encourage them to promote accurate information. It coined the phrase "infodemic" to describe the rapid spread of misinformation about the new virus. It has helped co-ordinate global efforts to find treatments and vaccines. It is working with drug firms to safeguard the supply of medicines. It is now a key player in COVAX, a plan to distribute 2bn doses of a Covid-19 vaccine in 2021. The WHO has rushed to digest research produced at high speed and explain what it means. Behind the scenes member-states are regularly told where the WHO thinks their measures are not aggressive or comprehensive enough" (The Economist, 2020).

[5] See in this regards Sperling & Webber's chapter "Vaccines for Covid-19: a case of global public goods?".

[6] Just in March 2020, Trump announced he would nominate someone to fill the US seat on the WHO's Executive Board, which has been vacant since 2018. On 29 May, Trump announced the US would sever its relationship with WHO and redirect funds to US global health priorities. On 6 July, the US administration officially notified UN Secretary General António Guterres of its intention to withdraw from WHO membership. In January 2021, in one of his first acts as president, Biden signed letters retracting his predecessor's decision. At end-2021, however, the US Executive Board seat is still vacant.

[7] An example is Catena-X, and automotive alliance founded by the major German car companies and their biggest suppliers to set standards for information- and data-sharing.

Conclusions

At the time of writing, the emergence of new variants is casting shadows on a rapid exit from the pandemic. In addition, multiple GVCs are disrupted by different forces, making it difficult to take a clear snapshot of the current situation, let alone predict what may happen in the near term. Against this backdrop, it may be premature to draw definitive conclusions, although the elements presented in this paper do suggest that the most extreme fears of a collapse of the liberal order as a result of Covid-19 appear unfounded. At the same time, the Covid-19 experience is showing that a number of fault lines persist which are not overridden by "flat globalisation" (Friedman, 2007) – the illusion that trade and technology have combined in a unique way to kill distance and increase wealth for everyone.

At a deeper level, the global pandemic has revealed the need for analysis and awareness across policy fields. There have been some global public health emergencies over the last four decades (HIV/AIDS since the 1980s, SARS in 2003, and the 2009 H1N1 pandemic influenza), but they have been less prominent in terms of both human lives lost and economic impact. All these events did not really surprise scientists who have been studying pandemics, whereas they caught authorities, economists and the general public by surprise. This lack of awareness is rather disturbing in view of the efforts deployed in recent years to use technology to trim costs to the bone and build more efficient supply chains.

In this respect, the G20 "can be, and must be, made to work better now, for the deadly global challenges we face are growing faster than the G20's performance" (Kirton, 2021). Governments can work jointly with firms on improving risk preparedness by identifying the range of potential threats to essential activities, mapping the local and international players involved in some essential chains, collecting and sharing information on potential concentration and bottlenecks upstream, and by developing stress tests for essential supply chains. The 2022-25 period, with the successive chairmanship of no fewer than four Global South countries (Indonesia, India, Brazil, and South Africa) can be an opportunity.

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RESILIENCE AND SECURITY OF SUPPLY-CHAINS

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Abstract

The modern global economy is one of humankind's most complex socio-technical systems ever created. Characteristics such as an orientation towards efficiency in "just-in-time"-production or worldwide distribution and regional concentration of production centers make it fragile and susceptible to disruptions like natural disasters, accidents or the Covid-19 pandemic. Covid-19 affected both the nodes of this system (factories, offices) and connections amongst nodes (transport hubs, flow of goods and people). Strategically important supply chains for defence goods, semiconductors, critical raw materials and pharmaceuticals were all affected, though differently. However, five categories of instruments are available to states and companies to increase the resilience of supply chains, from automation and reshoring to diversification, stockpiling, the support of domestic ecosystems and dedicated regulatory changes. NATO's role here should be to improve the availability of information, increase the topic's visibility, and prepare the Alliance for the inevitable next supply chain crisis.

The global economy as a complex system

The Covid-19 pandemic hit a global economy that is one of the most complex socio-technical systems ever created by humankind (Crutchfield, 2009: 5), consisting "of multiple components, each component active in different domains and structured in its own right, interconnected in ways that lead to emergent collective behaviors and spontaneous architectural re-organisation" (Crutchfield, 2009: 4). Complex systems are "intrinsically hazardous" (Cook, 2002: 1) and fragile systems, in which their fragility is hidden (Crutchfield, 2009: 1) from the observer due to its emergent characteristic (Crutchfield, 2009: 5). Moreover, the substitution of parts is limited in complex systems (Perrow, 1984: 88). One of the consequences of complex and fragile systems is that catastrophic failures are inevitable (Cook, 2002: 2).

Complexity (and inherent fragility) are necessary, but not sufficient conditions for catastrophic failures to have an extreme impact. For this to happen, a complex system also must be what Perrow called "tightly coupled" (Perrow, 1984: 62) – that is, parts of the system depend on each other and are immediately affected by a failure of another part. For modern industrial supply chains[1], this tight coupling manifests itself in widespread concepts like "just-in-time delivery" (ifo Institut, 2020: 7) and "warehouse-on-wheels", which describe the aim to minimize storage costs by increasing synchronization between production and delivery. Moreover, in an economic system based on competition, narrow margins dominate optimization efforts of companies such as outsourcing and

[1] Supply chains and value chains are used interchangeably in this paper.

single sourcing (ifo Institut, 2020: 7), decreasing their resilience to supply shocks. Lastly, supply chains for complex goods in the modern global economy are distributed across the globe and heavily concentrated in some regions simultaneously (see for instance Deutsche Rohstoffagentur, 2021: 1 for examples on raw materials up- and midstream).[2] Both features further increase fragility (ifo Institut, 2020: 7). Overall, global economic activity is a fine-tuned system that is not configured for significant and short-term variations in supply and demand (CNBC, 2021).

This description is not new and economic activity is regularly impacted by natural disasters, the destruction of particular production sites, political instability, conflicts between supplier and buyer, accidents or international trade conflicts (DIHK, 2020: 1). Supply chain risk management thus is an integral part of doing business, but it is likely to become even more critical due to the Covid-19 induced upheaval of supply chains (ifo Institut, 2020: 7). The main difference is that Covid-19 led to both supply and demand (see Baldwin & Freeman, 2020: 3)[3] shocks (Baldwin, 2020: 1) and asynchronous downturns in regional economies. So far, however, the benefits of the above-described system, such as lower prices, overall growth of wealth and increased innovation, outweighed the risks for most economic activity. Yet fracturing existing supply chains threatens to "dilute the efficiencies gained over past decades, fracture common standards and slow innovation" (Capri, 2020: 5).

Direct and indirect Covid-19 impact on supply chains

Supply chains are best imagined as connected nodes residing in different spatial and regulatory fields. Depending on the character of the supply chain – e.g., national, regional or global (ifo Institut, 2020: 19[4]), and the number of connections and nodes –, raw materials, components and products can cross borders several times over. Disruption of either nodes (companies or economies) or connections (transportation) impacts whole supply chains. Covid-19 affected both nodes and connections in direct and indirect ways. Such Covid-induced stress adds up to other unfavorable developments in the geo-economic realm that already put pressure on supply chains such as the US-China decoupling, techno-nationalism and greater state involvement in economic activity – what Borchert calls "flow control" (see for instance Borchert, 2019: 45).

A supply chain's resilience significantly decreases if there are concentrated points of failure, that is, an extreme concentration of technical specialization and transnational division of labour with limited replicability of these nodes by other actors (DIHK, 2020: 5). Heavily interconnected supply chains can easily create "spillover damage" and are thus crucial elements for supply chain resilience (Lee & Kleinhans, 2021: 9).

Covid-19 brought the importance of time and synchronicity in supply chains into the spotlight: not only do outages in production or transportation ripple through supply chains (Baldwin & Freeman, 2020: 9), but international trade flows mirrored the wave-like structure of infections during the pandemic (Baldwin, 2020: 8). First, European and American nodes had to wait for Chinese supplies after their

[2] On all levels, from upstream raw material production to midstream refining to downstream consumption.

[3] Demand disruptions due to: i) macroeconomic drops in aggregate demand (i.e., recessions); ii) wait-and-see purchase-delays by consumers; and iii) investment-delays by firms.

[4] "International value chains tend to be regional rather than global. Of course, this can be different for individual supply chains. Overall, the manufacturing and mining sectors are more integrated into international value chains than service sectors or agriculture".

shutdown, then the pattern reversed, desynchronizing supply chains (Baldwin & Freeman, 2020: 8). Nevertheless, most supply chains recovered relatively quickly (De Vetep et al., 2021: 40). Thus, they have proven to be comparatively resilient (bouncing back after a shock) but not robust (able to maintain operations during a crisis) (see for instance Brandon-Jones et al., 2014).

Direct Nodes

The most visible direct impact of Covid-19 on companies and economies came from containment measures: national lockdowns closed factories and offices, and reduced economic output (Baldwin & Freeman, 2020: 2). The pandemic also negatively impacted demand and future investments, in turn further slowing economic activity (Baldwin & Freeman, 2020: 3). Especially smaller companies with limited financial reserves and access to capital markets feared liquidity crises (Borchert & Jäkel, 2020: 6), which is why several European states explicitly designed support measures for this risk (IRIS ARES Group, 2020: 1). Overall, doing business got more expensive: work environments had to be adapted to minimize transmission risk, investments had to be made to find alternative suppliers (see Winter, 2021),[5] and input-product prices swung wildly the past two years (Schütz, 2020: 4). Nevertheless, the economic downturn impacted different sectors, companies and countries very differently. The severity of outbreaks, size and structure of supply chains, and concentrations of production nodes were important factors.

Direct Connections

Supply chains depend on the free flow of goods and people – which states heavily curtailed to contain the pandemic. This is the most important direct impact of Covid-19 on the connections in supply chains. One Covid-19 case in a port in China and its subsequent closure created effects that rippled through global trade (BBC, 2021). Staff shortages due to sickness or quarantine also impacted transport capacities (DIHK, 2021b). Trucks lining up before borders, even in Europe, due to border closures or other restrictions (DIHK, 2020: 2) (e.g., testing) impeded economic activity. Lastly, export restrictions, especially on healthcare-related goods, increase international protectionism trends, further augmenting the cost and effort of doing business (DIHK, 2020: 2).

Indirect Nodes

The major indirect impact of Covid-19 on companies worldwide is a change in product prices (Baldwin, 2020: 7) as supply and demand are changing fast and in unpredictable ways. Asynchronous economic recoveries, shifting demand structures, and the direct impacts on connections affect many products, from tinplate (RND, 2021) to timber (Lange, 2021) and plastics (RND, 2021) to semiconductors (Wolff, Poitiers and Weil, 2021: 20) and liquid oxygen (Griggs, 2021). Plastic is an excellent example for indirect Covid-19 effects: reduced demand for fuel decreased the availability of naphtha as a precursor of ethylene (and thus polyethylene) since naphtha is a by-product of oil refining (Mailbach, 2021). In turn, prices have increased by nearly 80% since the start of 2021 (RND, 2021). In other industries, shortages

[5] The larger the organization and the more complex the supply chain, this can mean significant work. For Volkswagen, for example, its raw material supply chain alone includes more than 1,000 suppliers.

in peripheral products can slow down production, e.g., if paper, plastics and glass for packaging of pharmaceutical goods are in short supply (ifo Institut, 2020: 31).

In some supply chains, such shortages and price increases incentivize companies to use substitutes, if possible, thus increasing pressure on other supply chains (Bloomberg News, 2021). Other events like the China-US trade war, natural disasters, and accidents further strain some supply chains (Wolff, Poitiers and Weil, 2021: 20). Following the Covid-19 crisis, financial reserves in many companies are depleted, leaving them little choice but to pass on price increases to customers (RND, 2021), decreasing consumption and economic recovery. Some central supply chains will significantly impact economic activity in other supply chains (Acemoglu et al., 2012), as currently seen in microchips/semiconductors.

Indirect Connections

Changing transportation patterns following changing supply and demand patterns indirectly impacted the global and regional transport of goods. This holds for several domains, but air- and seaborne freight were particularly affected (DIHK, 2021b). The reduction of passenger flights which usually also carry air freight, significantly reduced international capacities, thus increasing prices (DIHK, 2020: 2). Seaborne trade struggled with shifting volumes of available cargo, which dropped at the beginning of the crisis, primarily outbound from China (Baldwin & Weder di Mauro, 2020), before reaching new heights as US and European consumers bought a range of goods produced in China, which had already brought Covid-19 outbreaks under control. Such asynchronicity is inbuilt in connections because most shipped goods take weeks to arrive at their destination. Supply chain shortages, thus, are delayed (Baldwin & Weder di Mauro, 2020). Moreover, asynchronicity in economic recovery worldwide exacerbates transportation disruptions, e.g., container shortages (Berger, 2021) and port overloads (The White House, 2021: 6). Prioritization in the handling of cargo in overburdened ports can lead to shortages in particular goods that are neither perishable nor particular important for further production – one example being a tennis ball shortage in the US due to supply route chocking – ports (Aron, 2021).

Regulatory Picture

Regulatory decisions by key actors influence nodes and connections in supply chains. For example, Chinese ICT companies stockpiled US components before being banned from integrating them into their products, thus aggravating shortages during the pandemic (Wolff, Poitiers and Weil, 2021: 20). Another example are efforts to counteract Chinese coercion policies that are using its dominant position in rare earth metals (like Japan in 2010 and the US over the past years) (Theodosopoulos, 2020: 2). Lastly, trade-related agreements between major actors have consequences: the “Phase one deal” between Beijing and Washington in their trade dispute from 2020 and China’s commitment to buy goods worth 200 bn USD from the US will likely negatively impact demand for European goods (Hamilton & Quinlan, 2020: 3). Similarly, following US steel tariffs in 2018, Chinese steel diverted to Europe, which was then pressured to impose its tariffs (Hamilton & Quinlan, 2020: 3). Such effects might be even more important in the technological realm, where standards and regulation directly impact national security, as seen in the debate on 5G equipment. Lastly, economic sanctions directly

challenge existing supply chains and thus incentivize involved suppliers and buyers to reconfigure them.

Key strategic domains and Covid-19

Generally, strategic domains and products could be defined as the following: "Strategic assets are those that require attention from the highest levels of the state to secure national welfare against interstate competition" (Ding & Dafoe, 2021: 2). In current debates on strategic products and resilience in Europe and the US, the following areas repeatedly appear: semiconductors, batteries, critical minerals, pharmaceuticals (US House of Representatives, 2021: 20), energetic materials (US House of Representatives, 2021: 6), energy (NATO Reflection Group, 2020: 39), aerospace and defence, and digital applications (Fiott & Theodosopoulos, 2020: 2). As NATO underlines the importance of critical infrastructure for societal resilience, the list would also include products such as food and medical equipment (NATO, 2021b: 2). No asset has an in-built strategic character; its assessment is shaped by many factors (Ding & Dafoe, 2021: 5) and thus requires constant analysis, update and negotiation between Allies. Due to special concerns, this paper limits itself to four strategic domains: defence, semiconductors, critical minerals and pharmaceuticals.

Defence

Aerospace and defence supply chains are key strategic domains, especially from a NATO perspective. However, these supply chains have long outgrown national defence industrial bases. Complexity, spatial distribution (offshoring) (see Becker, 2020: 5) and specialization of companies and plants (Duggan, 2018) have made them as fragile as their civilian counterparts and more fragile than in the past. The loss of singular companies or plants (McIntosh, 2019) can significantly reduce production capacities. However, at least on the national level, some NATO members, like the US, enacted policies to keep defence manufacturing open during the pandemic.

Nevertheless, Covid-19 impacted the transborder flow of components for defence products, thus delaying production. Other delays in NATO countries were caused by the lack of personal meetings (especially in multinational projects), lack of possibilities to conduct hand-over checks or because acquisition organizations first had to acquire the necessary hardware for remote work (Schütz, 2020: 5). As defence supply chains are often regional rather than global, problems in the global transport sector did not hit as hard as in the case of civilian goods. Overall, however, detailed information for this sector is often unavailable for confidentiality reasons (EC, 2021a: 25).

Semiconductors

Semiconductors are an essential product in our digitalized world. Companies specialize in discrete production steps like "R&D, design, machine tooling, components, foundries, assembly, test, and packaging" (Ezell, 2020: 15). The rapid and ongoing technological innovation in this product category is only made possible by a worldwide collaboration of actors (Ezell, 2020: 9) and division of labour (Lee & Kleinhans, 2021: 2). "Each segment of the global semiconductor value chain has, on average,

enterprises from 25 countries involved directly, and enterprises from 23 countries in support functions" (Ezell, 2020: 1). Thus the semiconductor supply chain is truly globalized (Ezell, 2020: 11).[6]

Covid-19's main impact on the semiconductor supply chain was a shift in demand from products like cars to consumer electronics required for remote work and stockpiling by some companies (Wolff, Poitiers and Weil, 2021: 20). When the demand pendulum swung back in late 2020 and 2021, semiconductor production capacities were insufficient to support total demand, leading to the prevailing "chip shortage", e.g., in the automotive sector. However, other factors exacerbated the current crisis, like weather events (see Marin, 2021)[7] and an accident in one key plant (Baraniuk, 2021), underlining risks associated with supply concentration.

Critical minerals

All physical production starts with raw materials. Both the US (Silberglitt, 2015: 1) and Europe (EC, 2016: 3) depend on imports for many raw materials. These dependencies will increase with the rising demand for new technologies (EC, 2020: 9). Projections see massive gaps between production and demand over the coming years (Winter, 2021). One key element of current raw material supply chains is a concentration of upstream extraction (Silberglitt, 2015: 3) and midstream processing capacities. For example, China dominates processing capacities in rather "normal" materials like steel and rare earth elements (Theodosopoulos, 2020: 2) and lithium (Winter, 2021). For other elements, this concentration can be found in other countries: Brazil and the US control 90% of the niobium and 85% of the beryllium processing capacity (Theodosopoulos, 2020: 2). At least for the EU, the lack of extraction, processing, recycling, and separation capacities mark a high dependency on other nodes and actors and functioning connections (EC, 2020), including adversarial actors like Russia and China (Theodosopoulos, 2020: 2). Considerable concentration decreases the resilience of these supply chains globally, making them vulnerable to all kinds of exceptional circumstances (Theodosopoulos, 2020: 2) and disruptions.

Consequently, both direct and indirect impacts of Covid-19 on nodes and connections hit raw material supply chains. In a recent poll among companies, over 90% of German companies in the rubber and plastics, metal and chemical industries, and the construction sector reported shortages or massive price increases in raw materials (DIHK, 2021b).

Pharmaceuticals & personal protective equipment

The pandemic highlighted another strategic domain – pharmaceuticals and personal protective equipment. Especially APIs are mainly produced in India and China, and even within these two countries concentrated in very few provinces (MundiCare, 2020: 3). A handful of companies also dominate production (MundiCare, 2020: 3). Diverging regulatory frameworks and cost differentials are the main reasons for these globalized pharmaceutical supply chains (MundiCare, 2020: 3). Europe is left with the production of a few complex APIs with low production volumes (MundiCare, 2020: 3).

[6] In fact, the typical production process toward a final electronics product can see the underlying semiconductors within it cross international borders 70 or more times in a process that takes over 100 days and includes 3 full trips around the world.

[7] For instance, a drought in Taiwan impacting production.

Moreover, even within the outsourced production in India, there is a strong dependency on intermediate products from China (ifo Institut, 2020: 27). In the case of personal protective equipment (PPE), both the US and EU depend on China for between one third and two-thirds of products (Brown, 2020).

During the height of the pandemic, PPE was in short supply in the West. Though, the situation has normalized since then. For other drugs, the expected crisis did not materialise. Nevertheless, such a lack of equipment was very negative, exposed health care personnel to unnecessary risks and was noted in the public debate.

Rethinking supply chain management/governance

Existing suggestions on reorganizing supply chains can be clustered around five main themes: reshoring and automation, diversification, stockpiling, domestic ecosystems, and regulatory measures. Not all recommendations will be relevant to all sectors, and a sector-by-sector and supply-chain-by-supply-chain approach are necessary (The White House, 2021: 8). Moreover, these measures are not about reaching the opposite of the current globalized configuration of the global economy but aim more to an adjustment on a continuum (Wolff, Poitiers and Weil, 2021: 21).

Reshoring & Automation

One of the most obvious solutions to decrease the vulnerability of spatial distribution and thus reliance on regular connections is reshoring, the relocation of production into one's own country (ifo Institut, 2020: 14). Given that most reasons for offshoring production, like lower costs, less strict regulation, low transport costs etc., persist (ifo Institut, 2020: 5), reshoring will likely only be a viable option for sectors that can feature a high degree of automation to keep costs down. A recently introduced wild-card here are the increased transport costs over the past couple of months and the question of how soon they will come back to pre-Covid-19 levels (Romei, 2021). If capital is cheap, investments into robotics might make more sense than offshoring (ifo Institut, 2020: 14). Three additional factors that make reshoring attractive are increased flexibility, reduced production lead times, and quality issues. However, reshoring is not without drawbacks: even with automation, production costs are higher (DIHK, 2020: 7) and fewer jobs are created (De Vetep et al., 2021: ix). It may take companies significant investments to transfer tacit knowledge back into the domestic workforce (The White House, 2021: 7) and production ecosystem (Gilli & Gilli, 2019). Plus, building production capacities takes years (ifo Institut, 2020: 30). Hence, some observers prefer diversification over reshoring to increase resilience (De Vetep et al., 2021: 9).

Diversification

Diversification of sources (both companies and countries) is another strategy to reduce the fragility of a tightly coupled system like modern supply chains (DIHK, 2021a). However, it increases complexity and offers only limited against system-wide shocks like Covid-19. Furthermore, in more complex supply chains, there are no available alternatives for some components. Possible mid-term alternatives would require the build-up of new capacities (see Chapter 0). Nevertheless, diversifying sources, especially

for raw materials (Fiott & Theodosopoulos, 2020: 7), is seen as a preferable option to decrease vulnerability to singular actors, both of political (ifo Institut, 2020: 5) and economic (ifo Institut, 2020: 8) nature. Indicative empirical results support this thesis: several analysed companies followed diversification as a supply chain management strategy after suffering supply disruptions after the 2011 earthquake and tsunami in Japan (Freund et al., 2021).

Stockpiling

Stockpiling goods ("just-in-case") instead of relying on just-in-time delivery is the easiest solution to loosen a system's tight coupling (The White House, 2021: 8) as it does not entail the drawbacks of reshoring or diversification (Brekelmans & Poitiers, 2020). It does not change the fundamental nature of transnational or GSCs and dependencies but increases resilience against short-term shocks (DIHK, 2021b). Ironically, Toyota, which pioneered the just-in-time principle, managed the Covid-19 and the recent chip crisis better than many competitors that implemented just-in-time principles incorrectly (Williams & Ludwig, 2021). Stockpiling is efficient for most goods, from raw materials to components, especially when the required capital (ifo Institut, 2020: 14) is cheap and companies could easily invest in storage solutions and more goods. However, stockpiling cannot solve the current supply problems, and intensive stockpiling by some companies exacerbate them (Wolff, Poitiers and Weil, 2021: 20). Lastly, for some goods, obsolescence issues arise (Layton, 2020: 50).

Domestic Ecosystems & Supply Webs

Although necessary, rethinking supply chains in particular industries is insufficient for creating supply chain security for emerging technologies or a holistic reform of sectors. Such undertakings "require an ecosystem-building approach that includes supporting domestic demand, investing in domestic production, recycling and R&D, and targeting support of the […] workforce" (The White House, 2021: 8). Following such an approach across supply chains also enables better identification of central nodes and bottlenecks (see for instance Theodosopoulos, 2020: 5)[8] relevant for several industries and supply chains (thus constructing a supply web). Inseparable from this topic is the question of investments into a capable and qualified workforce (US DoD, 2018: 55). While it might be attractive to ponder the personnel shortages in emerging technologies (e.g., artificial intelligence/machine learning experts), Western states should also analyse what risk the large-scale relocation of production capacities has created for traditional vocations critical to industrial processes (e.g., welding in the defence industry). However, states must be careful in their approach to building ecosystems since government control in such endeavours has a "dubious track record" (Capri, 2020: 60), showing signs of corruption, rent-seeking and failure to punish low performance.

Policies

Allies could use three policy instruments to create favorable environments for private actors to enact the aforementioned measures: information collection and distribution, investments, and regulation

[8] Such as processing and refining for certain raw materials.

and legislation (US DoD, 2019: 99). Most importantly, there is a need to invest in human capital and information processing techniques as well as to establish closer contacts with private actors (US House of Representatives, 2021: 3) to build a comprehensive but understandable picture of existing, complex supply chains across industries (US House of Representatives, 2021: 10) and regarding emerging technologies and their subsequent supply chains (Csernatoni, 2021). While there are excellent studies on supply chains in some sectors – like for semiconductors (Khan, Mann and Peterson, 2021) –, such information is not readily available for others. Yet, policies to support strategic key domains require such information for good decisions and the identification of bottlenecks and resilience weak spots (for instance, as recommended for the US in The White House, 2021: 13, 17). One way to incentivize companies to build up and share supply chain data repositories is to link data collection and distribution to liquidity support for the private sector (Borchert & Jäkel, 2020: 6, 8).

Public investments are necessary to provide incentives for private actors to increase their resilience while also staying globally competitive. Industries that do the former while losing the latter are of limited value, and the costs of supporting them would continuously increase become less and less sustainable over time. Moreover, states could also support the industry financially to keep some production capacities for times of crisis, similar to electricity production in times of peak demand (ifo Institut, 2020: 28). Lastly, government investments into research & development (EC, 2021a: 44) will be necessary to develop new technologies and methods (De Vetep et al., 2021: x) in areas like extraction, recycling and further production automation.

Regulation and legislation touch upon standards, foreign direct investments, export controls and the retention of international trade regulations. Setting technological standards, e.g., in the existing international forums, can help domestic companies in their competitiveness and thus is a regulatory support measure. Moreover, standardization can help ease diversification of supply and substitution of inputs, enhancing the interchangeability of products and components. Screening foreign direct investments into key strategic domains has gained significant traction in Europe, not least due to the high-profile case of the German robot manufacturer Kuka. Such screening is also supposed to protect crucial nodes in supply chains from falling into the hands of potential adversaries for either siphoning off knowledge or closing such a node down.

On the other hand, export controls can use existing dependencies of other actors on Western products, though they should only be used in extreme cases. While the Single Market is crucial for the EU's economic resilience, the same goes for solid, effective and fair global trade regulations, whether bilateral or multilateral, as they provide companies with planning security in their economic activity, including the construction of supply chains. However, there is a delicate balance to be struck between investments and the retention of open markets.

NATO's role

NATO is fully aware of the supply chain risks and vulnerabilities highlighted by the pandemic, with the latest Communique from the Summit in June 2021 (NATO, 2021a) and other NATO documents like the NATO2030 Young Leaders Report (NATO 2030 Young Leaders Group, 2021: 8) flagging the issue under the heading of resilience. Resilience, of course, is nothing new for the Alliance either, going back to Article 3 in its founding treaty, which states that "[…], the Parties, separately and jointly, by means of continuous and effective self-help and mutual aid, will maintain and develop their individual and

collective capacity to resist armed attack" (NATO, 1949). With the latest redefinition of resilience in June 2021, resilience for NATO now includes supply chain security, the aim to diversify these, and the resilience of key infrastructures and industries (NATO, 2021d).

Risk

Beyond emergent risks of the complex and tightly coupled system of modern supply chains and external factors like accidents or disasters, NATO is rightly worried about intentional actions by adversaries that use supply chain fragility to further their economic, political, or military goals (NATO Reflection Group, 2020: 17). Such non-kinetic and non-military risks (NATO 2030 Young Leaders Group, 2021: 5) require improvements in resilience. As more countries are aiming to capture more economic value and knowledge from international supply chains (see for instance Ezell, 2020: 2 for semiconductors), "weaponized interdependence" will become more important, especially in globalized industries that are difficult to rectify. Societal, economic and, in the end, military readiness problems interact in resilience-related crises.

Role

Three main roles for NATO emerge from the previous analysis: information collection, visibility enhancement and preparation improvements. All Allies need more information on their domestic key strategic supply chains and their cross-border nature (see for instance US House of Representatives, 2021: 14 for the US) – knowledge that even companies themselves often lack (Borchert & Jäkel, 2020: 3). NATO could serve as a hub to set standards for information collection and centralizing results in a trustworthy environment. This would include close engagement with Allies and industry (US House of Representatives, 2021: 11). NATO could introduce mechanisms similar to the EU's new "resilience dashboards" (EC, 2021b). Yet information collection is not only crucial for existing supply chains but also to assess what changes in nodes or connections can have severe impacts on them in the future. Hence, import and export controls and investment screening for foreign direct investment into allied industries are important topics to investigate together by Allies (NATO 2030 Young Leaders Group, 2021: 20). However, trust remains both a precondition and a problem – even amongst Allies – as information on supply chains is highly sensitive. Developing technical solutions for anonymized data collection and fusion could thus be a task for NATO.

Boosting the visibility of supply chain security as a topic should be easy with the experience of the pandemic in everybody's mind. Yet, the risk is that the return to normality will also ease the pressure to address this issue – thus returning to "failures of imagination" for future crises. Therefore, NATO should challenge its member states cognitive biases and assumptions regarding the causes and effects of crises. Institutionally, reviving NATO's Economic Committee[9] is a step in the right direction (NATO 2030 Young Leaders Group, 2021: 9), intensive exchange with the EU another one, considering the important EU competencies on Single Market, industrial and innovation policies (NATO Reflection Group, 2020: 28). NATO should pay close attention to EU policies and documents like the upcoming

[9] "This Committee was tasked to 'study and report to the Council on economic issues of special interest to the Alliance, particularly those which have political or defence implications or affect the economic health of the Atlantic Community as a whole'".

Roadmap on the Reduction of Dependencies in Defence. An exchange between the two should also increase awareness for supply chain security and resilience in departments beyond MoDs, which would be well informed by the abovementioned NATO information collection and distribution mechanisms. Another task for a revived NATO Economic Committee would be to negotiate intra-Alliance trade disputes (especially beyond bi-lateral EU-US issues) and thus fulfilling what Article 2 of the North Atlantic Treaty lays out (NATO, 1949).[10] Examples for such disputes range from tariffs to extra-territorial export restrictions – like US International Traffic in Arms Regulations (ITAR). A more extreme measure would be to declare strategic economic activity as a warfare domain, where the Alliance would discuss and answer adversarial actions. As e.g., Russian electronic warfare explicitly targets defence industrial infrastructure (Kjellén, 2018: 23), there is an undeniable link between warfare and the industrial basis of NATO economies (Cancian, 2017). Lastly, recommending Allies to "buy allied" whenever possible would also retain attention for the topic (US House of Representatives, 2021: 9).

NATO could also improve the preparations of Alliance members and the Alliance itself for significant disruptions in supply chains and thus societal and economic life. First, the Alliance should therefore continue its work in establishing resilience baselines (NATO, 2021c) and create a more common understanding of resilience across Alliance members. Second, reviving instruments from the Cold War and updating them to the current era is one avenue here (see for instance Meyer-Minnemann, 2016). Bygone NATO Civil Wartime Agencies could serve as examples for agencies to deal with different dimensions of economic/supply chain crises in times of crisis or war (see NATO, 1963 for a list of the bygone agencies). However, to cope with the complexity of modern societal networks, it is likely that such agencies would require a permanent institutional skeleton at least. Thirdly, NATO should develop best practices in resilience crisis communication as poor communication might worsen supply crises. A fourth avenue is closer cooperation with the private sector to increase their resilience, stemming from the fact that the private sector is now so closely entangled with societal and economic resilience that addressing the problem without it would be insufficient. There are two potential instruments here: regular government-industry briefings on such matters and the inclusion of private sector representatives into wargames simulating resilience crises (Braw, 2021: 15). Certifying companies which participated and completed such exercises could highlight and operationalize resilience in the private sector and thus make it more visible for both the state (when looking for contractors) or investors (knowing that these companies are more resilient investments), increasing their confidence. The public sector in allied countries might also consider using its buying power to include resilience criteria and supply chain information requirements into its procurement guidelines. Lastly, NATO and its significant science and technology apparatus regularly engage in forward-looking exercises to identify militarily relevant future technologies (see for instance Reading & Eaton, 2020). These can help Allies tackle the difficult task of deciding which industries will likely be of strategic importance in the future – even though predicting the impact of technologies or industries in the future is generally considered a humbling exercise.

[10] "They will seek to eliminate conflict in their international economic policies and will encourage economic collaboration between any or all of them."

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WORKING GROUP REPORT

RESILIENCE AND SECURITY OF SUPPLY CHAINS

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This report summarizes, in a consolidated way, exchanges that have been held during three work sessions of the WG2 dedicated to "Resilience and security of supply chains":

- Session 1: the state of the art;
- Session 2: future scenarios;
- Session 3: so what for NATO?

In order to represent the most consistently the outcome of the discussion, the organization of this report may slightly diverge from the course of the exchanges. This report aims at reflecting as accurately as possible the discussion. However, it does not claim to be exhaustive: some elements that have been discussed have not been taking up in order to ensure the highest level of consistency of this report.

Conceptualizing the current crisis that affects supply chains

The Covid-19 the pandemic was a real break in the perception of the organization of globalized economy, as GVCs, including critical ones, have been encountering serious disruptions. Its consequences could equally impact the organization of globalized economy itself, depending on the policy solutions that will be implemented in the coming months and years.

To assess the effect of Covid-19 on globalized economy, a supply chain is best represented as "unidirectionally connected nodes residing in different spatial and regulatory fields" (Schütz, 2021). According to such a modelling, Covid-19 impacts directly and indirectly both nodes and interconnections between nodes:

1. Direct effects directly result from the pandemic itself and the sanitary policy measures necessary to contain it. At nodes level, it is mainly the closing of plants for sanitary reasons ("lockdown") whereas interconnections have been largely affected by the closure of borders, seaports, airports, etc.;
2. Indirect effects stem both from measures taken to address direct effects (e.g., the search for substitutes which may cause tensions on other supply chains) and from the lack of synchronicity in the outbreak and in the implementation of policy measures.

The impact of such direct and indirect effects has been dramatically increased by some characteristics of our globalized economy. In particular, GVCs have largely been organized around the "just-in-time" axiom, in order to reduce storage costs notably. Such an organization that also aims at reducing redundancies has maximized the effects of the Covid-19 outbreak. The centrality of certain

manufacturing hubs (such as China or Japan) also led to a widespread propagation of the impact of disruptions. Of course, all supply chains have not been affected in the same way. Defence supply chains, for instance, are far less internationalized than semiconductors' ones. One of the principal problems that has emerged during the pandemic is the overreliance of European (and Western) supply chains on China ("the elephant in the room").

Facing such a situation, very different solutions exist and have been implemented so far from export restrictions to reshoring, diversification, or stockpiling. The absence of coordination at global and transatlantic levels have probably amplified the effects of the Covid-19 crisis. Two main limitations can be identified at policy level that will impact the choices of solutions:

1. The (financial, political, etc.) cost of measures taken to face the pandemic-related crisis. For instance, stockpiling appears as quite effective for certain kind of critical components or equipment (e.g., medical masks). However, it has a certain financial cost, and its potential lack of usefulness may have a political cost (see for example the criticisms of the French government's decision to stockpile masks and vaccines, during the 2009 swine flu crisis). Incentivizing courageous and long-term oriented decision appears very difficult.

2. The lack of trust among Allies that prevent effective coordination of policy measures across GVCs. This is a collective action issue at NATO level, where no real competence in industrial policy exists. Even though governments at global level are aware that the most effective solution lies in international cooperation and information sharing, the lack of mutual trust could seriously hinder such a scenario. But modern industrial ecosystems are very expensive to recreate. It sharpens the question of their political acceptability: can we afford not to enjoy their benefits despite their potential costs in times of crisis.

Such limitations will certainly make more difficult the balance to be stricken between "protective" measures, necessary for national security purposes, and the benefits from an interconnected global economy and GVCs. Indeed, research demonstrates that interconnected regimes are more economically effective and more resilient than "localized regimes". Indeed, the latter prove to have a lower level of economic activities and income and to be more vulnerable to shocks that interconnected economies.

Major trends that shape the future

Several uncertainties characterize the evolution of GVCs and global manufacturing. But, beyond this truism, most of the trends that are shaping the future of GVCs are still ongoing. Indeed, the supply chain crisis is not finished: transportation costs have drastically risen, for instance, with the congestion of transport routes. However, some major trends that will affect the future of GVCs can already be identified.

First, the global economic context has largely transformed for manufacturing since the 1990's. Indeed, at that time, low transportation costs at global level, low wages in certain countries and the lack of attention to climate change was a favorable environment for the globalization of value chains. Nowadays, energy and transportation costs have risen. Wage increases in developing countries and the development of automation and digitization made the economic argument for relocation less

compelling while the growing attention to climate change is progressively leading to less geographically dispersed supply chains. The macro-economic context will be a powerful driver for the future of the organization of global economy.

Second, strategic competition among major powers at global level has considerably developed and spread to very different areas such as trade. This strategic competition is increasingly based on science and technology (as the recent UK Integrated Review demonstrates it). This trend is not recent: ten years ago, the Chinese export ban on strategic raw materials to Japan has been a very effective lever of action in a territorial dispute. Furthermore, both the post-Covid-19 economic recovery and the so-called "twin transition" (digitization and decarbonation of the economy) are demand-driven and extremely material-intensive, in particular for some "rare earths". This scarcity of raw materials is expected to amplify competition among nations.

A third structuring trend is a direct consequence of the Covid-19 pandemic. It is the increasing importance of resilience (of supply chains, in particular) in public opinion. Resilience has now become a political priority that can take several forms (stockpiling, reshoring, diversification, etc.).

Those different trends trigger at least three questions which remain mostly unanswered:

1. What do we want to truly achieve at policy-level? Whereas resilience has become a new buzzword for policymakers, it appears that GSCs have proved significantly resilient through the crisis. Indeed, resilience refers to the ability of a system to return to normal operation after a disturbance. According to this definition, and despite the lasting disruption of international transportation, GSCs have come back to normal functioning quite rapidly (e.g., Covid-19 tests, vaccines, etc.). This is particularly true at EU level where the functioning of internal market went back to normal extremely fast. However, for certain strategic goods and supply chains, resilience is not enough. Robustness refers to the ability of a system to cope with a disturbance and to maintain its functioning, in the most "normal" way. Solutions certainly vary from a good to another, from a supply chain to another.

2. How do we strike a balance between securing the benefits from GSCs while addressing the growing pressure for resilience and/or robustness? This question has implications at several levels. The most important one is directly linked to the appropriateness of European political economy to the new global context. Indeed, some of the Chinese or US policy measures can be extremely detrimental for European markets and economy. Indeed, subsidizing certain strategic economic activities has become a major trend to secure both strategic and competitive advantage. As the issue of "race to subsidies" is likely to remain a major feature of international competition in the coming years, Europeans still need to significantly adapt their common political economy to cope with the new context. For instance, they will need to mainstream a "planning culture" (similarly to what exists in defence or space sectors) to other strategic goods and supply chains, as global competition increasingly requires a comprehensive approach of economy. Another example is the centrality of certain hubs in GSCs which may trigger some anxiety at policy level as they increase the propagation of shocks. However, they are key in driving benefits from GSCs (e.g., knowledge spill-overs). Finding the right balance will be extremely difficult.

3. How can we ensure the required level of cooperation among Allies? Whereas existing research shows that international cooperation and policy coordination is and will be increasingly needed to face disruptive crises, recent past and current events show that this is not what is happening. However, from a policy point of view, resilience may refer either to a certain form of autarky or to increased interdependencies among Allies, which requires a high level of trust and coordination. However, the current difficulties stemming from the lack of information sharing or from the existence of export control regimes – e.g., US ITAR and Export Administration Regulations (EAR) – are detrimental to the building of such a high level trust.

Implications for NATO

Facing such a context, promoting the resilience and security of critical value chains poses multiple challenges in multiple policy areas. The first concern about NATO contribution to current reflections is its competence when it comes to economic matters. Even though NATO is also an "economic community" (Article 2 of the North Atlantic Treaty), it lacks the competence to directly address issues that mostly concerns manufacturing and political economy. However, despite this lack of "tools", several actions at NATO level may have a significant impact:

1. The first added value of NATO implication can be enhancing the visibility of the issue of resilience and security of strategic value chains and framing the problem. Indeed, a crucial aspect is the lack of common definition and language across the transatlantic community. Resilience of supply chains, "nodes", "interconnections", etc. need to be defined in a common way to enable cooperation and coordination of policy measures.

2. Second, NATO can incentivize Allies to commit in self-assessment of supply chains resilience (especially through "scenarios-to-failure" exercises). The existence of a NATO document which would set requirements and criteria for self-assessment would be a very useful tool for Allies which may not be used to such exercises (very few of them have national emergency supply agency). Furthermore, the existence of such a document would certainly increase the peer-pressure among NATO to realize such exercise. Indeed, a key point when it comes to resilience is planning.

3. Finally, NATO can certainly act as a focal point to collect and gather information at transatlantic level.

However, NATO and Allies will have to cope with several challenges that will be defining:

1. The level of trust among Allies and the heterogeneity both in threat assessment (e.g., the US is aiming at a full strategic autonomy while Europeans have a more nuanced approach) and in the underlying security interests.

2. Cultural diversity across the Alliance can be a serious challenge, especially when it comes to "scenarios-to-failure" exercises. Indeed, according to national cultures, ability to admit mistakes (which is the key thrust of such exercises) can prove more or less difficult.

3. The political acceptability of certain measures is a particular challenge for democracies which are mostly driven by the “tyranny of the short term”.

4. Cooperation with other organizations, such as the EU or the WTO, will be a key factor. Indeed, such bodies have relevant competences for addressing resilience and security across supply chains and, thus, can prove particularly useful to define and implement coordinated solutions. A critical element will be to initiate cooperation with those organizations at the very beginning of the solution definition process and not at the end.

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(Photo credit: ANSA, Ciro Fusco)

WORKING GROUP III

THE MILITARY INSTRUMENT OF POWER AND PANDEMICS: A LONG-TERM PERSPECTIVE

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Abstract

The potential consequences of a pandemic were predicted in many security risk assessments published over the past decade. The short-term impact has resulted in significant loss of life and disruption to health services and wider domestic security. The focus for NATO has been to prevent the health crisis becoming a wider security crisis. This paper examines the breadth of activities undertaken by the "military instrument" to contribute to global and national responses to the crisis. It also identifies an emerging consensus on the longer-term effects of the Covid pandemic on defence and security from an Alliance perspective. It takes a mixed-methods approach, combining evidence from a collation of open source information on the role of the armed forces during the Covid crisis in five NATO countries (UK, Canada, Netherlands, France and Belgium), and a review of twelve academic papers specifically focussed on the implications for NATO.

The paper identifies many uses of the military instrument under four themes: maintain military capability; protect health and provide healthcare for armed forces personnel (and other beneficiaries of military health systems); provide generic assistance to the civilian response; and to augment civilian health and social care with military reinforcements. The Covid crisis has reinforced "domestic resilience" as an "instrument of national power" alongside others (strategic communications, political, digital, intelligence, financial and legal) that lie beyond the conventional Diplomatic, Informational, Military, and Economic (DIME) paradigm. Looking to the future, the cost of the military instrument in the "Comprehensive Approach" to global and national crisis response needs to be balanced against investment in other instruments of national power.

NATO has supported information sharing, collaboration, and brokering of mutual support across members of the Alliance. The Alliance will need to determine how much of this should endure, noting the improvements in civil-military cooperation, greater health intelligence and public health capacity, increased understanding of the interdependency of key military capabilities with equivalent civilian functions (health, logistics, digital services), and the value of existing standardization and coordination mechanisms.

Introduction

Prior to 2020, many strategic risk analyses included pandemics as a potential threat to global and national security (NATO ACT, 2017; UK MoD, 2018; Coats, 2019). The short and medium-term impacts

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of the current Covid pandemic on health are well known (Simonsen & Viboud, 2021). Longer-term second and third order implications on other dimensions of security, such as economics or trade, are starting to emerge (Meyer et al., 2021). The pandemic has exposed limitations in the capacity of health systems, weaknesses in GSCs, and vulnerabilities in cyber-protection, strategic communications, and societal cohesion. Many of these shortcomings have been or may be exploited by adversaries to the detriment of global or national security (NATO, 2021).

NATO's priority during the Covid pandemic has been to ensure that the health crisis does not become a security crisis (NATO, 2021). Alongside national armed forces, the Alliance's activities have been structured into: measures to protect military personnel both in allied missions and within the NATO force structure; continuing to deliver credible and effective deterrence and defence through maintaining military capabilities; and assisting the civil authorities in their response to the crisis. From the perspective of NATO Allied Command Operations (ACO), this has been organized in three phases (Fazekas, 2021). The first was the Initial Response phase, January 2020-May 2020, covering the first wave of the pandemic in Europe, and focussed on protecting NATO personnel and essential military capabilities. The second was the General Response phase, June 2020-May 2021, covering the second and third waves in Europe. This phase consolidated the protection and response structures and processes with the intention of eliminating the impact of the pandemic on NATO personnel and operations. The current phase (Autumn 2021) is the Specific Response phase, running from June 2021, and is characterized by the availability and administration of vaccination to military personnel and the subsequent restoration of NATO's focus on collective defence and security.

Conceptually, the security capabilities of a state comprise the "4 Instruments of National Power" – Diplomatic, Information, Military and Economic – using the acronym DIME (US Joint Chiefs of Staff, 2018). The Military Instrument is either a "supported" function during times of conflict or a "supporting" function during humanitarian crises, natural disasters, or other emergencies. This recognizes the contribution of non-military instruments and the importance of integrating all four Instruments into a unified plan. However, the DIME paradigm does not capture all of the capabilities of states and some authors have extended this to include Finance, Intelligence and Law Enforcement (DIME-FIL) (Oskarsson, 2017), and adding Development (acronym MIDFIELD) (US Joint Chiefs of Staff, 2018). The incorporation of these Instruments into processes for cross-government coordination in policy, strategy and planning is reflected in various phrases such as "Comprehensive Approach" (Major & Mölling, 2009), Joint, Interagency, Intergovernmental, and Multinational (JIMM) (US Joint Chiefs of Staff, 2020), "Fusion Doctrine" (UK Cabinet Office, 2018), "Integrated Action" (UK MoD, 2021), or even "Total Defence" (Maskaliunaite, 2020). The Covid crisis has reaffirmed the essential role of domestic resilience as a foundation upon which to build national power. Whilst resilience has been a concern for NATO over the past decade, the fragility of national health systems to the Covid pandemic has been a strategic shock.

Consequently, this paper addresses two questions:

1. What are the similarities and differences between nations in the use of the military instrument to support the response to the Covid pandemic?

2. What is the emerging view on the implications of the Covid pandemic on defence and military capability?

This paper focusses on NATO. It is informed by our research analysis of the national responses to the Covid-19 pandemic through the lens of medical military support requirements undertaken on behalf of NATO ACT (Bricknell et al., 2020), as well as a comparable analysis of how the Covid-19 crisis has affected security and defence-related aspects of the EU (Meyer et al., 2021). It also refreshes and builds upon our comparison of the initial civil-military response to the Covid pandemic in six European countries (Gad et al., 2021).

Sources

This paper presents the initial results of two complementary research studies. The first is a retrospective comparison of the use of the military instrument (armed forces) in the response to Covid between five NATO countries (United Kingdom, Canada, Netherlands, France and Belgium) based upon publicly accessible documents detected using a Google™ search. A full description of this method is at Annex A.

The second component of this analysis is a review of the published literature to identify the emerging consensus on themes arising from the Covid pandemic that will impact defence and security in the future. Focussing on NATO, the NATO library has already created a collection of papers on this topic (NATO Multimedia Library COVID-19). As of 1 August 2021, this collection contained over 110 publications. Based on an assessment of relevance for NATO, a shortlist of twelve papers was selected for review. The list of papers and method of analysis is at Annex B.

The military instrument and the response to covid

The comparisons of the use of the military instrument in the response to Covid between five NATO countries are in the following tables at Annex A: Table 3 (Maintaining military capability); Table 4 (Protecting the health of the armed forces and beneficiaries of military health systems); Table 5 (Generic military assistance to the national response); and Table 6 (Specific military assistance to the national health and social care response). Table 4 is reproduced below to illustrate the method of interpretation.

Table 4: Protecting the health of the armed forces and beneficiaries of military health systems

4. Protecting the health of the armed forces and beneficiaries of military health systems						
Activity	**UK**	**Canada**	**Netherlands**	**France**	**Belgium**	**Other country example**
4.1 Technical advice to the "executive"	X	X	X	X	X	
4.2 Health communication						
4.2.1 To military personnel	X	X	X	X	X	
4.2.2 To beneficiaries		X		X	X	
4.3 Self-care support						
4.3.1 At home				X		
4.3.2 Covid hotels	X	X			X	

4.4 Covid Testing (of beneficiaries)		X		X	X	
4.5 Remote consultation	X	X		X		
4.6 Covid Vaccinations		X				
4.7 Clinical Care	X			X		
4.8 Recovery and Rehabilitation	X		X			

There is an example of every activity for at least one country in this table. In the other tables, if no example was found from this sample then an example from another country is cited. An illustration for interpretation of the table: in the UK, the military health system has no responsibility for families of armed forces personnel and so there are no entries for healthcare support to beneficiaries; this contrasts with Canada, France and Belgium. This approach to comparison was used for all activities between all countries in all tables.

Across all tables, only a few activities were reported by every country, namely "technical advice to the executive", "health advice to military personnel", "military liaison to government emergency management", "distribution of medical supplies" and "support to community testing of Covid". There are a limited number of entries in Table 3, probably reflecting a desire to limit public reporting of the impact of Covid on military capability. Activities listed in Table 4 reflect changes in arrangements for the provision of healthcare for armed forces personnel and other beneficiaries of the military health system. Notable innovations include: creation of Covid hotels to isolate military personnel exposed to Covid cases; Covid testing of military personnel and families; video or telephone remote consultations; specific clinical management of military cases of long- Covid. Table 5 shows examples of military support to the wider civilian response including: augmentation of national crisis response management; global repatriation of national citizens during the early phase; support to logistics; military augmentation to police internal security operations; and support to environmental decontamination. Table 6 covers all forms of assistance to the health and social care system. Military medical personnel and units have augmented the civilian health system, primarily by providing extra clinical personnel. There have been different methods of creating extra hospital capacity. The French Army deployed a field hospital early in the crisis, the UK and Belgium built temporary hospitals (though these have not been used as intended), and those countries with military hospitals (France, Netherlands and Belgium) have allowed access by civilian patients.

This analysis shows the value in developing a common description for military activities in support of the Covid crisis to enable comparisons between countries. The list of common activities suggests those capabilities that armed forces might need to maintain or further develop as part of their contribution to their national response to a future health threat. This particularly applies to the following:

- Public health intelligence and communication for armed forces personnel and beneficiaries of the military health system;
- Deeper integration of civilian and military health services to enable access to healthcare and exchange of health data (including vaccination data) for armed forces personnel and beneficiaries of the military health system;

- Liaison and civil-military interoperability across all national instruments of power as part of national crisis response capabilities; this includes similar capability/capacity within NATO (including the NATO/EU interface);
- Interoperability between military and civilian health systems to enable military augmentation to civilian health services; including further work on standardization of credentialing of military medical personnel, drugs and medical equipment to enable cross-border mutual support;
- Civil-military collaboration in science and innovation, including the use of military personnel as research subjects;
- Civil-military liaison/collaboration for health diplomacy activities with international partners.

Differences between countries may reflect the unique context or circumstances of a particular nation indicating: a military capability that might require investment in other countries; activities that were shown to have limited value and so not required in the future; a failure of this method to detect an activity that actually occurred. Examples of such differences are shown below:

- Use of military facilities (hospitals and military accommodation) for isolation and quarantine (e.g., France);
- Deployment of military medical units using field military equipment (e.g., the French resuscitation hospital deployed to Mulhouse);
- Creation of large, temporary intensive care hospitals (e.g., UK Nightingale hospitals);
- Creation of large, temporary "step-down" care facilities for vulnerable patients (e.g., UK Nightingale phase 2);
- Military augmentation to nursing/social care institutions for the elderly (e.g., Canada);
- Use of armed military personnel to augment domestic police and internal security services (e.g., France).

Views on the future of the military instrument

Annex B divides the thematic analysis of the twelve NATO orientated papers catalogued by the NATO library into four areas:

- Covid and threats to national security;
- Covid and instruments of "national power";
- Covid and impact on the military instrument;
- Implications of the Covid crisis on defence and security.

The table at Annex B shows considerable agreement across the papers. In summary:

- The Covid crisis has demonstrated the importance of biological agents as a discrete threat stream that is a risk to national security;

- Second and third order impacts of Covid across a range of factors could be a precipitant to other causes of confrontation or insecurity;
- Domestic resilience is an important instrument of national power (with health systems being an important component);
- The authors mention most instruments of national power under the DIME-FIL acronym with specific commentary on (i) the military instrument to maintain deterrence and (ii) the support of the military instrument to the diplomatic and information instruments. There is additional mention of the military support to the science and technology, intelligence, and cybersecurity components of the Covid response and wider national security;
- There is no mention of Overseas Development Assistance in a security context, though assistance to the Covid response of partner nations has been an important diplomatic activity for many countries within and beyond NATO (so called "mask" or "vaccine" diplomacy);
- Covid has posed a threat to military capabilities, though mitigated by force protection measures;
- The military instrument has made important contributions as a responder in the national and international response to the pandemic;
- The economic impact of the pandemic and related increase in sovereign debt may affect defence budgets;
- Civil-military collaboration, cooperation or integration has been an important feature of crisis response;
- Whilst the potential for Emerging and Disruptive Technologies to change the type of threats to security was discussed, this was not a unique consequence of Covid.

It is likely that a NATO perspective would emphasize the risks and impact of Covid on Euro-Atlantic collective defence and security, as well as advocating for further investment in military capabilities. Such analysis would be expected to stress the military contribution to the response – though it is difficult to ascertain those that are directly attributable to NATO rather than the result of national or bilateral collaborations. The contributions of the NATO Covid Taskforce, the Euro-Atlantic Disaster Co-ordination Centre (EADCC), and the Science and Technology Organization (STO) have been particularly highlighted by authors. It is also difficult to ascertain the overlap or duplication between military activities brokered by NATO and those brokered through the European Union including the role of Trust Funds.

Discussion

There are many common themes from these two analyses of the impact of Covid on the NATO military instrument. Whilst pandemics and other health threats had been widely cited as a security threat across a range of strategic risk assessments, the potential impact was shown to be significantly "under mitigated" when challenged by Covid. Serious vulnerabilities have been exposed in the capacities of health systems and other domains of national resilience. The armed forces of all NATO members have

been a strategic capability in support of their national responses. In many nations, some elements of the armed forces were already earmarked for domestic resilience. In others, pre-existing assistance mechanisms were invoked. These activities, alongside the restrictions required to minimize the risk of transmission of Covid within the military community, has significantly restricted "military productivity". This has affected the throughput of recruits, basic and advanced individual military training, collective training and the availability of military units for "force generation". This was most pronounced at the beginning of the crisis and multi-national organizations were not able to call upon nations to provide the medical augmentation needed to provide Covid testing to medical care for Covid patients on missions. Whilst some of this capability gap was filled by commercial solutions, it does highlight the challenge for the Alliance of establishing deployable reserves under NATO command, especially for low-density, high-value, shortage capabilities like military medical units.

It is widely accepted that Covid has been a strategic disruptor with potential second and third order impacts on factors that may affect security into the medium and long-term. The crisis may act as an additional stressor along existing geo-political fault lines. Fortunately, this crisis has largely remained a civilian, non-military issue with the military acting in a supporting capability. There has not yet been any instance of armed conflict or organized violence occurring because of the health crisis that has affected international security at strategic level. However, the cross-government, interagency and multi-dimensional capabilities that have been mobilized to mitigate the crisis have illustrated the over-simplification of the concept of national power as solely the four instruments of DIME. This analysis has noted the emerging additional instruments of Finance, Intelligence, and Law Enforcement (FIL).

Many commentators have emphasized the importance of "domestic resilience" as a strategic capability, the separation of Political from Diplomatic activities, the clarification of "information" as "strategic communications" and the separate importance of freedom of manoeuvre in the "digital" environment including cyber defence. In conceptual terms, the DIME paradigm should be extended to include these, alongside the additional instruments of FIL. Noting that these are all mutually supportive and interdependent, NATO may wish to extend its range of expertise to include technical advisory or staff capacity in these additional instruments. A suggested list of potentially relevant fields is shown below, making up the acronym "SCRIMPED":

- Strategic Communications;
- Resilience;
- Intelligence;
- Military;
- Political;
- Economic;
- Diplomatic;
- Finance;
- Law Enforcement;
- Digital.

In addition to extending the “instruments” within the DIME paradigm, it is also important to capture organizational lessons from the evolution of crisis management mechanisms for leadership, direction and coordination across all of these instruments. The response to the Covid pandemic has shifted from crisis response to a sustained campaign that has dominated national and international policy. It is likely to remain a significant priority even as governments and multi-lateral institutions try to widen their horizons to address other important topics. NATO has already increased capacity in the political, strategic communications and cyber instruments. We suggest that NATO should review the existing functions that have had to adapt or increase capacity during the pandemic to determine those changes that should be sustained for the long-term.

Conclusions

Covid has realized the potential of a pandemic risk to cause a global health security crisis and has exposed multiple vulnerabilities across many dimensions of domestic resilience. So far, the Covid pandemic has remained a health crisis without a deterioration into a security or defence crisis, thus Alliance members have not needed to invoke the Washington treaty to mobilize in collective defence. NATO and national militaries have responded by protecting health and providing health services for their personnel and beneficiaries, minimizing the impact of the crisis on critical national defence capabilities, and providing military support to the civilian response. NATO has mainly acted to broker information and support between Allies. The crisis has shown the value of the military instrument within the breadth of instruments of national power. Conceptually, the DIME paradigm needs to expand to include many other “instruments” that operate in synergy in the “Comprehensive Approach”. Additional instruments might include: political, strategic communications, domestic resilience, digital, intelligence, finance, and law enforcement. NATO has adapted existing processes to establish a recognized “Covid picture” that fuses information across these instruments from multiple sources. The Alliance will need to interpret this experience to determine how much of this adaption can be resourced and maintained into the future. Other NATO coordination mechanisms have demonstrated its value for information and collaboration across the Alliance. This analysis has re-emphasized the contribution of allied military forces to domestic resilience and the role of NATO in brokering mutual support using military capabilities across member states. This has implications for the availability of Allies’ military capabilities in responding to an Article 5 crisis if they are likely to be required concurrently to support a domestic response to such a crisis within nations. This risk is especially important when considering low-density, high-value, shortage capabilities that rely heavily on Reserve forces such as military medical support.

Annexes

Annex A: Comparison of the use of the military instrument (armed forces) in the response to Covid between 5 NATO countries - description of method and full results.

Annex B: Thematic Analysis of Commentary Papers on the implications of the Covid pandemic for NATO - description of method and results.

Annex A: Comparison of the use of the military instrument (armed forces) in the response to Covid between 5 NATO countries - method and full results

This study analysed the contribution of the armed forces to the response to the Covid pandemic across four categories:

- Maintaining military capability;
- Protecting the health of the armed forces and beneficiaries of military health systems;
- Generic military assistance to the national response;
- Specific military assistance to the national health and social care response.

Methods

Three sources of information were: a general Google™ search, a Google Scholar™ search, and an internal search of official government websites. The following search strings were used to identify and collate open-source material:

- Covid AND military AND selected country e.g., Covid AND military AND Canada;
- Covid AND (armed forces) AND selected country.

For the general Google™ search and Google Scholar™ search, sources were collated until neither "Covid" or "coronavirus" and the country name were are highlighted in the website summary for at least ten hits. The same search string (excluding the country name) was used in the search tool of the government websites identified in the Google search.

The following types of documents were identified and included:

- Formal government reports;
- Formal military medical services reports;
- Publications in academic journals;
- Presentations at public conferences;
- Public statements by senior military medical officials;
- Reports in formal publications of authoritative institutions based on primary sources.

The following types of documents were excluded:

- Publications on other topics related to military medical systems;
- News articles (unless the information was based on an official primary source);
- Social media (unless the information was based on an official primary source).

Each record was reviewed twice to detect whether there was a report of one or more types of military activity in each of the four components and subordinate activities. This study captures each activity that was reported by each country, it does not capture the frequency of the activity or the level of

military commitment to the activity. If none of the countries report a type of activity, and example is provided from another country.

Results

Tables 3-6 show the full results of the search for activities by each component.

Table 3: Maintaining Military Capability

3. Maintaining Military Capability						
Activity	**UK**	**Canada**	**Netherlands**	**France**	**Belgium**	**Other country example**
3.1 Command and Control	X			X	X	
3.2 Existing Operations					X	
3.2.1 National	X	X	X	X		
3.2.2 International	X	X	X			
3.3 Rotations of forces	X					
3.4 Maritime Operations		X	X	X		
3.5 Reaction Forces	X					
3.6 Training						
3.6.1 Individual Training	X	X	X			
3.6.2 Collective Training	X	X	X			
3.6.3 Mission-specific Training						
3.6.4 Recruit/Entry Training						US
3.7 Recruiting	X		X			
3.8 Remote working	X	X	X	X	X	
3.9 Cybersecurity						
3.9.1 Military						
3.9.2 Civilian/national	X					
3.10 Intelligence						
3.10.1 Military	X					Israel
3.10.2 Civilian/national						
3.11 Strategic communications						
3.11.1 Military			X			
3.11.2 Civilian/national						
3.12 Military diplomacy			X			
3.13 Military health diplomacy	X	X		X		

Table 4: Protecting the health of the armed forces and beneficiaries of military health systems

4. Protecting the health of the armed forces and beneficiaries of military health systems						
Activity	**UK**	**Canada**	**Netherlands**	**France**	**Belgium**	**Other country example**
4.1 Technical advice to the "executive"	X	X	X	X	X	
4.2 Health communication						
4.2.1 To military personnel	X	X	X	X	X	
4.2.2 To beneficiaries		X		X	X	
4.3 Self-care support						
4.3.1 At home				X		
4.3.2 Covid hotels	X	X			X	
4.4 Covid Testing (of beneficiaries)		X		X	X	
4.5 Remote consultation	X	X		X		
4.6 Covid Vaccinations		X				
4.7 Clinical Care	X			X		
4.8 Recovery and Rehabilitation	X		X			

Table 5: Generic military assistance to the national response

5. Generic military assistance to the national response						
Activity	**UK**	**Canada**	**Netherlands**	**France**	**Belgium**	**Other country example**
5.1 Government emergency management capability and capacity						
5.1.1 Military liaison	X	X	X	X	X	
5.1.2 Embedded personnel	X	X	X		X	
5.2 Augmentation of non-health response						
5.2.1 Global repatriation	X	X		X	X	
5.2.2 Procurement	X					
5.2.3 Movement of materiel			X	X		
5.2.3.1 Land	X					
5.2.3.2 Air	X					
5.2.3.3 Sea						
5.2.4 Storage and distribution		X	X			
5.2.5 Border security		X	X			
5.2.6 Internal security	X		X	X	X	
5.2.7 Environmental decontamination			X	X	X	

Table 6: Specific military assistance to the national health and social care response

6. Specific military assistance to the national health and social care response						
Activity	**UK**	**Canada**	**Netherlands**	**France**	**Belgium**	**Other country example**
6.1 System Augmentation						
6.1.1 National command and control	X	X				
6.1.2 Regional/local command and control	X	X				
6.1.3 Medical personnel augmentation	X		X	X	X	
6.1.4 Medical Logistics			X	X	X	
6.1.4.1 Procurement	X			X		
6.1.4.2 Manufacture						
6.1.4.2.1 PPE						US
6.1.4.2.2 Sanitisers						Spain
6.1.4.2.3 Drugs						
6.1.4.2.4 Vaccines						China
6.1.4.3 Warehousing		X	X		X	
6.1.4.4 Distribution	X	X	X	X	X	
6.1.4.5 Medical research	X	X		X		
6.2 Community Care Pathway						
6.2.1 Protection measures						
6.2.1.1 Enforcement of restriction of movement			X			
6.2.1.2 Management of quarantine facilities					X	
6.2.1.3 Support to vaccination services	X	X	X			
6.2.2 Detection of Covid						
6.2.2.1 Community Testing	X	X	X	X	X	
6.2.2.2 Contact tracing		X				
6.2.3 Self-care						
6.2.3.1 Support to isolated or vulnerable populations						Brazil
6.2.4 Out-of-hospital care						
6.2.5 Pre-hospital transport			X	X	X	
6.2.5.1 Augmentation of ambulance services	X				X	
6.2.6 Hospital care (see 6.3)	X					
6.2.7 Nursing and Social Care	X	X	X		X	
6.2.8 Recovery			X			
6.2.9 Mortuary Services						Italy
6.3 Hospital Care Pathway						
6.3.1 Military Hospitals						
6.3.1.1 Designated Covid hospitals			X	X	X	
6.3.1.2 General access for civilian patients				X	X	

6.3.1.3 Access for specific new populations					X	
6.3.2 New/temporary hospitals						
6.3.2.1 Temporary hospitals	X				X	
6.3.2.1.1 Build	X					
6.3.2.1.2 Staffing	X					
6.3.2.1.3 Operate	X					
6.3.2.2 Military field hospitals				X		
6.3.2.3 Military hospital ships			X	X		
6.3.3 Assistance to Civilian Hospitals	X		X			
6.3.3.1 Screening for Covid						
6.3.3.2 Emergency Assessment	X					
6.3.3.3 Diagnostics						
6.3.3.3.1 Laboratory Testing				X	X	
6.3.3.3.2 Other diagnostics						
6.3.3.4 Respiratory Care						
6.3.3.5 Intensive Care				X		
6.3.3.6 Step-down Care		X				
6.3.3.7 Discharge						

Annex B: Thematic analysis of commentary papers on the implications of the Covid pandemic for NATO - description of method and results

Method

The full list of papers hosted by the NATO Multimedia Library in the Covid-19 collection was reviewed by MB and ZH. Those papers that specifically considered the impact of the pandemic for NATO were selected and shown below:

List of selected papers

Reference Number	Date	Institution	Title
1	20/11/2020	DNAT, Science and Technology Committee	Covid-19, International security and the importance of NATO STO
2	20/11/2020	DNAT, Political Committee	Covid-19 and Transatlantic Security
3	21/11/2020	DNAT, Defence and Security Committee	NATO'S Essential role in the Covid-19 pandemic
4	03/03/2021	DNAT, Civil Dimension of Security	Enhancing the resilience of allied societies through civil preparedness
5	01/11/2020	NDC Policy Brief - 21	The pandemic and the military: towards total defence?

Reference Number	Date	Institution	Title
6	01/10/2020	NDC Policy Brief 17	Catalyst or crisis? Covid-19 and European Security
7	01/10/2020	NDC Policy Brief 18	Covid-19 and the defence policies of European states
8	01/09/2020	NDC Policy Brief 15	NATO and the Covid-19 emergency: actions and lessons
9	01/03/2021	NATO STO	The military impacts of Covid-19 on the Alliance: Challenges and Opportunities
10	01/10/2020	Brookings Institute	NATO'S response to Covid-19: Lessons for resilience and readiness
11	01/05/2021	Finnish Institute of International Affairs	Covid-19 Effects on peace and conflict dynamics
12	08/12/2020	Danish Institute for International Studies	War on the Virus : Military Responses to Covid-19 Challenge Democracies and Human Rights Around the World

Every paper was re-read by each author to determine the topics of discussion under four categories:

- Covid and threats to national security;
- Covid and instruments of national power;
- Covid and impact on military instrument of power;
- Implications of the Covid crisis on defence and security.

Subcategories were created for each of the topics listed by every paper. The papers were re-read a final time to record the presence of a discussion for each topic and subcategory. Table 7 shows this for all papers.

Table 7: Thematic Analysis of Commentary Papers on the implications of the Covid pand*emic for NATO*

Reference Number	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Primary theme	Science and technology	Transatlantic security	Crisis response	Military readiness	Role of military	European security	Defence policies	Strategic communication	Military operations	NATO preparedness	Conflict dynamics	Democracy and law enforcement
1.0 Covid and threats to national security												
1.1 Biological threats as a "threat stream"	x	x	x	x	x	x	x	x	x			x
1.2 Second and third order impacts of Covid as a precipitant of other causes of insecurity	x	x	x	x		x	x	x	x	x	x	x
1.2.1 Economic	x	x	x	x	x	x	x		x	x	x	
1.2.2 Information	x	x	x	x	x				x			x
1.2.3 Food		x	x	x		x					x	
1.2.4 Social cohesion		x		x		x	x		x		x	
1.2.5 Cyber	x	x	x	x	x		x		x	x		

1.2.6 Breakdown of international system	x	x	x			x	x	x		x		
2.0 Covid and instruments of national power												
2.1 Health systems as a component of national resilience	x			x	x	x		x				
2.2 Health systems as a strategic vulnerability				x			x					x
2.3 Other instruments of national power		x	x	x		x	x	x		x		
2.3.1 Diplomatic vs Political			x	x	x	x		x			x	
2.3.2 Information	x	x	x	x	x				x	x		x
2.3.3 Military		x	x	x	x	x	x	x	x	x		x
2.3.4 Economic		x	x	x		x	x		x		x	
2.3.5 Financial		x	x	x		x			x		x	
2.3.6 Intelligence		x			x				x			
2.3.7 Law Enforcement												x
2.3.8 Resilience	x	x	x	x	x	x	x	x	x	x		
2.3.9 Science and technology	x	x	x	x	x		x		x			
2.3.10 Information Security				x	x				x	x		x
3.0 Covid and impact on military instrument of power												
3.1 Maintenance of military capabilities	x	x	x			x	x	x	x	x		
3.2 Support to national crisis response	x	x	x	x	x	x	x	x	x	x		x
3.3 Economic impact on Defence budgets		x	x		x	x	x		x	x		
3.4 Source of diplomatic competition		x	x	x		x						
3.5 Greater insecurity resulting in greater demand for military security		x	x			x			x		x	
4.0 Implications of the Covid crisis on defence on security												
4.1 Resource allocation across all instruments of national security		x	x	x	x	x	x		x	x		
4.2 Civil-military collaboration, cooperation, integration	x	x	x	x	x	x	x	x	x	x	x	
4.3 Securitization and implications for democracy	x	x										
4.4 Military versus wider security capabilities			x	x	x		x					
4.5 Military in direct support of civilian crisis response	x	x	x	x	x	x	x	x	x	x		
4.6 Military resilience against CBRN threats	x			x	x				x			
4.7 Military health services	x	x		x	x		x	x	x	x		
4.8 Emerging and Disruptive Technologies	x			x	x		x		x		x	

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MILITARY INSTRUMENT OF POWER AND PANDEMICS: A LONG-TERM PERSPECTIVE

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Abstract

When the Covid-19 pandemic occurred, military forces worldwide were among the first to respond. Because of their unique ability to respond in flexible, specialized and effective manner to almost any type of crisis they can be considered as an instrument of last resort. Armed forces provided reinforcements in terms of highly trained medical personnel, and arranged for their troops to contribute to the transport of vital supplies. Nevertheless they always maintained their primary duty, namely delivering credible and effective deterrence towards foreign adversaries. By being able to cope with a large array of tasks they help better understand the concept of "resilience" which, in the defense and security realm, mainly concerns civil-military cooperation. Yet, Covid-19 questions what role the military should prioritize in a period defined by a multiplication of tasks for the military within a limited budget. These important choices will not only affect the capability development of NATO armed forces but more generally how European conceives this instrument of power.

Introduction

After Covid-19, bio-hazards have left the realm of science fiction or horror movies to be seen in their sharpest and most dangerous impact: not just the number of casualties, but how they can damage state cohesion, democratic institutions, critical infrastructures and societal welfare – as much as kinetic attacks. And like in movies, when there seem to no better option, the military appear as the *ultima ratio*.

"Improvise. Adapt. Overcome". The unofficial motto of the US Marine Corps might highlight how, during the pandemic, NATO's armed forces have performed in a highly unusual type of campaign and against a very different type of adversary. For more than a year, throughout the world, armed forces have had the sometimes-unfamiliar task to assist the governments in providing mainly (medical) support, logistics, security and public order in support of law enforcement agencies. Because of their unique abilities and array of skills, in some cases soldiers and support staff were deployed and made visible in the streets – an extreme measure for certain countries, which tend to associate military presence in the civilian realm as a sign of political instability. Nevertheless, the deployment of troops on a gradually more permanent basis is not always exceptional: in France, operation *Vigipirate* against the terrorist threat has been a reality for the past 20 years; in Italy, operation *Strade Sicure* has been running since 2006 mainly but not only as counter-terrorism effort. In other cases, such as disaster relief, military personnel bring in their specialized equipment and expertise for crisis management –

for instance in 2021 in Rhineland-Palatinate where more than a thousand German soldiers with 200 military vehicles served as cleanup and rescue effort (see for instance Knight, 2021).[1]

This only highlights the continuity in the full spectrum of armed forces' roles. Whilst their primary task is to protect their country and, if necessary, to go into combat in a full-scale war, they have the unique flexibility to respond to almost whatever sort of crisis may emerge, on national soil or abroad as an instrument of last resort. Therefore, the military instrument has become – if it has not always been – a mean for attaining foreign policy objectives as well as to protect the national interests also domestically. When the Covid-19 turned into a global crisis, worldwide, military forces were among the first to respond because a variety of reasons: they represent a significant pool of trained, disciplined men and women that can be quickly called upon; they are resourceful, mobile and flexible; they know how to operate even in dire situations; because in many cases they are innovative and responsive, and for sure know how to make the best use of their equipment.

In spite of these exceptional measures, and whilst taking part in the global response to the pandemic, armed forces remained at the same moment focused on maintaining their ability to deliver credible and effective deterrence (Mesterhazy, 2020: 3). This ability to operate "full spectrum" is deeply engrained in the military's DNA if not in their means of action, yet it raises a lot of additional concerns. First of all, it seems that the military is tasked to perform more and more "civilian" actions in a world which has become more and more complex, raising the problem of being able to act decisively – and not just timely. Second, the military might be considered as a "Swiss army knife" that ends up responding to any given mission, yet without having the associated means. Tasks have been multiplied and resources have shrunk, creating some "bonsai armies". How can militaries perform with the same level of efficiency in a large array of missions, from crisis management at home to high intensity conflict, if nobody seriously defines what are the priorities? How could and should these armed forces be reorganized and restructured to cope with these new requirements? In an era of renewed great power competition, where both the socio-economic context and the international security environment have never looked as uncertain as they do today, there seem to be only hard choices to be made and states have to weigh defense concerns against other (social, economic) pressing problems.

The military and pandemics: lessons from the past

Traditionally, the military is one of the four instruments of national power – among diplomacy, information and economic – the so-called DIME approach. It enables a government to reach its national security goals. Armed forces have long been considered as the preferred instrument for the conduct of war in Clausewitz terms, namely coerce foes and physically impose its will on adversaries. Yet, the military also own various capabilities that are useful in non-conflict situations such as disaster relief, and in some cases they can complement civilian capabilities when needed, integrated with the other instruments of national power.

From a historical perspective, considering how the coronavirus has profoundly impacted our societies, and our militaries, one can question whether this situation has happened before. In other terms, have

[1] Back in June 2013, almost 20,000 German soldiers were mobilized to help the population evacuate their homes and build sandbag levees and riverbanks as the Elbe and Danube rivers flooded.

we historical precedents on how to best employ the military instrument of power in the fight against pandemics? One of the most documented examples surely is the Great Plague that hit Marseille in 1720. When the disease broke out, it quickly overwhelmed the city. The Parliament of Aix passed a law, which levied the death penalty for any communication between Marseille and the rest of the Provence region. To enforce this lockdown, a plague wall (*mur de la peste*) was erected across the countryside, with guard posts. More than a quarter of all royal troops were sent to Provence and would remain mobilized during two years. In Marseille, two regiments were deployed to establish public order, patrolling the city and monitoring both the inhabitants and the spread of the plague.

Another enlightening example is the Spanish Flu of 1918-1919. In three successive waves, the disease killed more than 50 million people – more deaths than the entirety of the First World War. Massive military movements and overcrowding contributed to massive spread, and the virus struck armies and civilian population alike. In plain terms, the ratio of deaths from combat to those of disease was 1:1.1 – for every 10 soldiers killed in combat, 11 died of disease (Lynch, 2020: 3). The French were evacuating 1,500 to 2,000 cases per day. In some cases, military operations were almost disrupted due to the transportation of sick soldiers and filled hospital beds (Coombs, 2020: 63).

The study or the comparison with the Spanish Flu is interesting for observing how militaries implemented policies to prevent the widespread transmission of the disease. Basic hygiene measures were enforced. The evacuation and/or quarantine of ill soldiers were ordered. Improving accommodation for troops was also rapidly identified: in ports of embarkation, the US Army recommended a minimum of 60 square feet per soldier to avoid overcrowding and the Medical Corps stressed the need to increase the floor space per man in barracks (Lynch, 2020: 5). Nonetheless, due to the war effort, priority was set to protect the military first and foremost, rather than having the military supporting and helping the society at large. At the exception of Canada, where military doctors contributed to the implementation of public health policies, most of the militaries were tied to the wartime effort and could do little to aid the civilian population (Coombs, 2020: 66).[2] This case study underlines the priority of force protection, above all other considerations, especially when at war, at the detriment of other actions.

A more interesting, yet less known, occurrence is the US Operation United Assistance in 2014. Being a public health, humanitarian, and socioeconomic crisis with devastating effects, the Ebola disease overwhelmed the medical capacity of Liberia, Guinea, Sierra Leone in just four months and prompted the US to allocate more than USD 2.3 billion and employ its military to slow and then control the outbreak (JCOA, 2016: 1). The White House decided to leverage the unique capabilities of the US military and the broader uniformed services to help bring the epidemic under control (The White House, 2017). The US operation was indeed a novelty as it was one of the first moment where the military were engaged in fighting a disease – whereas all the operating procedures had been previously based on disaster relief. Therefore, the first response was equivalent to a disaster relief and humanitarian operation with logistics, helicopter airlift, or medical capabilities. But the particular nature of the disease and its spread led to committing the military to a more robust and broader operation, including sending port-opening teams to establish air- and seaports, deploying communications support in theater, and augmenting planning efforts at US Africa Command (AFRICOM) headquarters. The initial mission was to build hospitals throughout the country of Liberia

[2] In addition, to protect the military, most of the civilian physicians were mobilized, this reducing the possibility to aid the population.

but due to the poor infrastructure, the effective assignments ranged from transporting supplies to scouting the sites of construction, to the building of the units and the recruiting of healthcare workers. What was also at stake was the necessity of force protection: protecting the military strength was paramount, to maintain readiness and the ability to operate.

The involvement of the military: key issues and concerns

The way of dealing with pandemics, both recently and in the past, underlines three common patterns:

- The military acts in support of and assists civilian authorities;
- The military provides specialized means that are not available elsewhere;
- This mission is only one among others, at the condition that it can be effectively done without a degradation of military endeavors.

Military organizations are usually among the first to respond to emergencies, although their participation may depend on the circumstances. In France, for instance, the involvement of the military remains strictly governed by law. Apart from the state of siege or the state of war, which are two exceptional legal regimes, the use of the armed forces can only take place for law enforcement missions under very specific conditions, qualified as "state of necessity". The state of necessity intervenes "when the means at the disposal of the civil authority are considered to be non-existent, insufficient, unsuitable or unavailable" (French Secretariat-General for National Defence and Security, 2017). When civilian resources are unavailable, the representative of the State on a territory – usually the *Préfet* (the highest civilian authority in a *département*, i.e., a county) requests the military to assist the civilian authorities. This process – a kind of requisition – results from a permanent dialogue between the civil authorities and the military institution. In fact, the French army is thus regularly called upon to assist civilian operators with human or material resources, particularly during natural disasters.

The pandemic, in many ways, modified this process. First, because of the nature of the risk. The disease was not the result of a biological attack, but due to its rapid propagation, it has had – and still has – a seismic impact at all levels across the globe. Overwhelmed by the number of cases, most NATO and EU member states logically turned to the military to contribute to the best of their capacities: logistics, evacuation, public order, medical support. For example, Italian and Spanish armed forces have been assisting with a similar range of tasks –emergency transport of supplies and personnel, EU repatriation efforts, public space disinfection, lockdown enforcement, border control and food and water distribution. France launched *Opération Résilience* to enable air, land and maritime forces to assist with the full range of civilian response efforts to the pandemic, not only in Metropolitan France, but also out in French territories and dependencies across the globe from the Caribbean to the Pacific. Germany deployed 15,000 soldiers to protect critical infrastructure, distribute medical supplies, establish medical hospitals; it has also flown critically ill patients from France and Italy to hospitals in Germany for treatment. The US deployed the National Guard in California, New York and Washington to deal with Covid-fighting supply logistics (Mesterhazy, 2020: 3). The EU mobilized its European Air Transport Command to fly supplies and evacuate sick people from a country to another, in a form of global European assistance facilitated by the availability of military assets. NATO's EADRCC has

coordinated the deployment of Allies military forces both in member states – i.e., Albania, Italy, Montenegro, North Macedonia, Spain – and partner countries such as Bosnia-Herzegovina, Georgia, Moldavia and Ukraine.

Two domains have especially highlighted the value of military contribution. Primarily, the reinforcements in terms of highly trained medical personnel who, despite their limited numbers, prove to be a valuable asset.[3] In the US, the Navy mobilized two naval medical ships and shipped them to New York City and Los Angeles to offload pressure on local hospitals. Elsewhere, temporary field hospitals and other medical facilities were set as in Northern Italy already in Spring 2020. The French Medical Military Service designed a 30-bed military intensive care field hospital in Mulhouse to join and support the public hospital by offering a fully integrative intensive care system (Pasquier et al., 2021). Preparing for the second wave, in October 2020, the Czech military erected a 500-bed military hospital in the northern part of Prague (Bellamy, 2020). In many countries, military medical labs worked extensively alongside their civilian counterparts to study the virus and help sustain the global research effort.

Second, in the logistics domain, troops helped transport vital supplies. In several states, military personnel were not to administrate vaccines but to lend their hand in logistics to ensure the vaccine would be available across their nations. In Italy, in 2021 the choice of a military figure with extensive experience in logistics was the government's choice to improve the vaccination campaign (Follain, Albanese and Rotondi, 2021). In France, to speed up the vaccination, the army and firefighters opened and managed "giant vaccination centers" (Thompson, 2021). The Polish Medical Emergency Detachment provided its support to vaccine both military and civilian staff at NATO's HQ in March 2021 (NATO, 2021b).

All in all, militaries were involved to a greater extent when their country was severely affected. The British deployed more than 20,000 military personnel and assigned them to the Covid Support Force. In Germany, the Bundeswehr was ready to provide assistance to civilian authorities, and approximately 32,000 military personnel were assigned to this task. In Denmark, even though the absolute majority of the Danish military worked from home to help prevent the spread of infections, military personnel were assigned to Covid-19 call centers to assist in the tracking effort. In all NATO countries, the contribution of the military was made visible: even if their role was not to be either reduced or overstated, the involvement of the military added a sense of urgency to the pandemic-induced crisis though. It is not surprising to see how the military played also a strategic communication role: the risk was to be taken seriously.

Making the best out of the pandemic? Russia and China

For other competitors in the world, the military performed another role. Russia and China actively developed their power strategy, exploiting available opportunities and neglected areas, as well illustrated during the Covid-19 pandemic. Both countries have played a sort of "pandemic era diplomacy", which has lifted the veil over their global strategic ambitions in the context of great power competition. With the US shift to Asia-Pacific, Europeans have observed at their doorstep how

[3] After decades of cutbacks in the armed forces, many military medical personnel are now reservists and were already mobilized to work in their civilian capacity.

strategic competitors act… which in return demands some higher level of ambition, and its operational engagements.

For Moscow, since 2014, the use of its armed forces abroad is much more assertive. Russia counts on renewed military capabilities, but also on Kremlin-controlled private military contractors, immaterial capabilities and its diplomatic influence. Russian armed forces have been able to project themselves more easily into more distant theatres such as Libya and Syria which underlines a sort of strategic opportunism. In this context, during the pandemic propagandistic success were made for instance in Spring 2020 through large supply of medical equipment and personnel to Italy, which obtained relatively vast and positive media coverage – the Russian military transport vehicles drove across Italy to reach contaminated areas with banners reading "From Russia with Love" (The Economist, 2020). Moscow also offered its help to countries seen as vulnerable and that could be politically influenced, such as Serbia (Goble, 2020).

The pandemic has exposed some of the strategic ambitions and modes of action of the Chinese regime. Openly acknowledging its strategic rivalry with Washington and exploiting all possible opportunities, Beijing has developed a strategy with both active and aggressive actions and tone. It has raised the reach of its ways of influence to a global level and intends to weigh more directly on global issues. Its subordination tactics on IOs such as the WHO or the World Food Programme were made all too visible. The so-called "Mask diplomacy" has seen the Chinese military load and ship planes full of medical staff, ventilators, and, of course, masks and other personal protective equipment all over Europe. This influence proved somehow that China has become, as the crisis demonstrated, the "systemic rival" described by both EU and NATO official documents, while remaining an economic competitor and sometimes an important diplomatic partner (EC, 2019).

New realities: how the pandemics redesigns the military instrument of power

That the pandemic has affected the way we collectively think "security" and "defense" is a tautology. The Covid-19 crisis has not created a more peaceful world, it has rather exacerbated trends that were already present, or pending. In fragile states, the demands of the pandemic have distracted political leadership, institutions and resources, and hostile actors have exploited the weaknesses in state responses (Mustasilta, 2020). Some argues that the pandemic might negatively affect conflict dynamics through its detrimental and asymmetric economic impact on middle- and particularly low-income countries (Meyer et al., 2021).

In Europe, questions have arisen about the longer-term effects of the pandemic on defence policy and the military: considering the dramatic increase of sovereign debts in many states, in clear terms, how will the pandemic affect defence capacities and spending (see Marrone, 2021)? The pandemic has severely affected the economy within the European Union. Some 2020 estimates forecasted that the size of most EU economies would only reach pre-pandemic levels in 2022 or 2023. The speed of the recovery remains in question, but what is clear is that the combination of high public debt and poor fiscal position will probably lead to budget cuts. Recent history proves that cutting defence spending is sometimes seen as a quick fix solution to implement austerity measures. However, in an era where geopolitical uncertainties are becoming the norm, where the rise of systemic rivals is a reality, further reducing defense budgets seems not be an option. Even when priorities shift towards the socio-economic domains, when it comes to national security and defence, most European Nations are not

considering to diminish their investment. As a matter of fact, and even if the effort remains uneven, European nations have begun to adjust their defence budgets since 2014 in a rather constant manner. The crisis years between 2008 and 2012 already resulted in major cutbacks in budgets and capabilities, and the latter have only just returned to 2008 spending levels. Were Europeans to make further major cutbacks in their budgets, they would deal a fatal blow to the most fragile military capacity of some frail states and to Europe's capacity for collective action. In this respect, the willingness shown by a large majority of Allies within NATO to maintain the growth of defence expenditures, despite the economic crisis, is a positive sign that needs to be confirmed in the mid- to long term (see French MoD, 2021).[4] Despite the high level of ambition portrayed by the EU for the European Defence Fund (EDF) and the proposed funding for military mobility, cuts have already been made on both initiatives in 2020 because of the Covid-related shift of the EU 2021-2027 budget towards socio-economic priorities.[5]

For Europeans in general, the pandemic associated with the multiplication of sources of instability at Europe's borders, calls for a real push for a "European Strategic Autonomy" – a concept which had been formalized already in the *EU Global Strategy* of June 2016. Discussing the political dimensions and the acceptance of such a concept goes beyond the scope of this paper. Yet it is worthy to mention that time seems ripe to develop a genuine European pillar of security and defence, consistent with developments in NATO. This implies progress in three directions: consolidating European defence, reducing dependencies, and developing common responses to hybrid aggression (French MoD, 2021; Franke & Varma, 2019). In this sense, the definition of a "strategic compass", a project launched by Germany that should be endorsed under the French presidency of the Union in 2022, should provide a clear and updated picture of the changing global strategic environment, reflecting the 360 degrees generic threat and challenges.[6] The challenges, risk and uncertainties brought by the pandemic within and beyond Europe further support the wake-up calls for Europeans to do more for their Continent and the world affairs.

All starts with resilience?

To face the numerous "unknown unknowns", and be at the same moment agile, flexible and responsive enough, a buzzword has emerged among the security and defence pundits in the Euro-Atlantic area: resilience. It has been endorsed by national governments and international institutions on the assumption in a complex world, one has to be ready, aware and prepared to the next crises. Back in 2015-2016, resilience was first and foremost the new concept to respond to hybrid threat and strategies used mainly by Russia. It then spread to other fields and domains, becoming more and more popular and addressing issues about climate, environment, technology and so forth. Restricted to the defence and security realm, resilience can be understood as a way to improve the ability to better link or connect the military and the civilian actors in a more collective and coordinated manner, especially

[4] In addition, member states have learnt from the 2008 Eurozone Sovereign Debt crises that the post-crises cuts were too deep and too damaging to their capabilities.

[5] Respectively EUR 7.9 billion and EUR 1.5 billion, rather than EUR 13,4 billion and EUR 5,9 billion.

[6] This calls for pursuing the operationalization of the European command structures (European Union Military Staff - EUMS/Military Planning and Conduct Capability - MPCC), the strengthening of EU action in the maritime and air domains, the increased sharing of operational assets and support bases in strategic areas, the improvement of European situation assessment tools and the establishment of the European Peace Facility (EPF). In addition, the harmonization of the capability instruments (Permanent Structured Cooperation - PESCO, Coordinated Annual Review of Defence - CARD and EDF) is key to develop a truly European strategic autonomy.

to become a sort of new deterrent against the strategies mastered by foreign competitors (see Lasconjarias & Larsen, 2015 on hybrid strategies; see Lasconjarias, 2017 on resilience).

> "Practitioners of hybrid warfare are often less intent on seizing and holding territory than destroying or disrupting the ability of societies to function. Antagonists wishing to inflict harm upon a society look to key nodes where critical infrastructures connect. […] When war changes, so must defense. New approaches are urgently needed that extend traditional efforts at territorial protection and deterrence to encompass modern approaches to resilience. […] Militaries are still relevant, but many critical requirements are civil. Hybrid responses require arrangements that encompass both civil government organizations as well as key private sector entities" (Kramer, Binnendijk and Hamilton, 2015).

From a NATO perspective, the 2016 Warsaw Summit has framed a list of elements that should help a state or a government resist any type of crisis. Limited in scope to the core elements maintaining the overall capabilities of a state or a nation to run smoothly, NATO considers seven critical baselines requirements:

- Continuity of government;
- Resilient energy supplies;
- Resilient civil communications services;
- Resilient Food and Water Supplies;
- Ability to deal with large scale population movements;
- Ability to deal with mass casualties;
- Resilient civilian transportation systems.

Also labelled "civil preparedness", this NATO approach focuses on the range of crises or security challenges which may test an Ally's resilience and, by identifying those risks, prepare for them accordingly (see NATO, 2021a).[7] Of course, the pandemic has shed new light on how to deal with the same ideas, even when the threat is not a malign competitor but a virus. In 2020 the US Ambassador to NATO suggested that Allies could plan forward house facilities available to stock non-perishable equipment, such as those of which some Allies were short of during the recent crisis (Tigner, 2020).

For others, the crisis has also highlighted the need for a versatile military, capable of strengthening the nation's resiliency through their ability to take action in a wide variety of critical situations, from health or environmental disasters to terrorist or hybrid attacks up to full-scale conflicts. Generally speaking, there have been discussions about the role of the military, and what it should do: should the focus be more on human security or international action? Covid-19 context also happened at a moment where most of NATO member states had experienced a sort of "operational fatigue" that led them to re-prioritize on domestic defence. The availability of the military was therefore less an issue, except for those countries still committed to overseas operations.

[7] During the Cold War, and up to the late 1980s, NATO had policies and planning for "Civil Preparedness and Civil Emergency Planning" as well as civil wartime agencies, covering shipping, inland surface transport, aviation, insurance, supplies, oil, and refugee movements. The bottom line was to ensure that military operations could proceed without the risk of the "home front" falling apart.

France provides an interesting case study as it underlines how the military has visibly contributed to the national effort to combat the virus while under pressure and without renouncing to its operational commitments in terms of nuclear deterrence, homeland protection, internal and external operations. In particular, the following four points are worthy to consider in a more general reflection on the military instrument of power in light of Covid experience.

- First, as the pandemic has proved, the armed forces, because of their specific capabilities and know-how (for example in planning), play an important role in the cross-government response to any kind of attacks or threats. In some cases, they might even become the first responder.

- Second, their capabilities need to be reinforced to deal with large-scale crises. In this respect, the implementation of a strategic "protection-resilience" function is now clearly necessary. Indeed, the notions of protection and resilience complement each other, as resilience is an essential prerequisite for ensuring the protection of the French people and the national territory and guaranteeing the continuity of the nation's essential functions (see French MoD, 2021).[8]

- Third, and for many years, France's armed forces have been permanently deployed on national soil somehow as homeland security forces. This increased role in internal security has required specific resources and training. Similarly, in the face of the CBRN threat, particularly of a terrorist nature, it is clearly indispensable to reinforce the equipment dedicated to this threat, as well as the formation of all personnel, and to pursue research programs in the biological and chemical fields. At the same time, as conflicts now emerge in contested domains such as cyber, space or seabed, there's a need to continue strengthening the capabilities of the armed forces to operate in all of these areas and this obviously poses challenges in terms of resource allocation.

- Fourth, resilience calls for reconsidering certain in-service support dependencies. Faced with a crisis that affects delivery flows, supplies for the armed forces cannot be based solely on a logic of efficiency, inspired by a private sector model. It is essential to have strategic stocks and to accept the associated additional costs. Outsourcing of services must also take account of resilience issues. What is true in the light of the Covid-19 crisis would also be true in the event of a strategic surprise with a completely different nature (i.e., digital or environmental), and *a fortiori* in the context of a high-intensity engagement possibly threatening the homeland.

In this sense, resilience starts with a resilient military that helps strengthen the other government bodies as well as the society. It does justify the defence spending and its increase, as the military very concretely demonstrates its contribution not only to the nation's security, but also to the economy, employment and social cohesion.

[8] The rationale behind this function could be extended to European partners and Allies, as it deals with a notion of autonomy in a broad sense.

As an intermediate conclusion

How will the pandemic affect NATO militaries? That Covid-19 has been a formidable disruptor is evident, as it has revealed the fragilities of Western societies, has highlighted the greed and malicious intents of strategic competitors, and has questioned our very ability to act rather than respond.

More than discussing the role of the military as an instrument of power, the pandemic has shed light on the choices made by our Western societies, how they envision the role of the armed forces, how resilient they holistically are, and if stakeholders have reasonably taken into account future risks and threats. Calling up the armed forces has exposed the renewed importance of the military as *ultima ratio*. Problem is, military have been responsive in lieu of the once natural and evident resources that should have been on the first line of response (health services for instance). The latter have been sacrificed for avoiding redundancies and duplication or transferred to the private sector in a move that characterizes the evolution of our economies since the 1990s.

Pandemic has accelerated the need for Western military to fulfill an extensive role within a broader approach based on resilience and protection concepts. Credibility, flexibility, innovation, readiness are the key words that should drive the pathway to the militaries of the Twenty-First Century. Yet the competition between core tasks "sandwiches" the military between priorities: it is up to stakeholders to accept and redefine what the military instrument should do or not do, and in many ways, help redesign at home the root elements of a resilient society. The military, despite its culture of risk, is still only a tool, even if the most solid one.

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WORKING GROUP REPORT

MILITARY INSTRUMENT OF POWER AND PANDEMICS: A LONG-TERM PERSPECTIVE

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Introduction

What has been the role of armed forces during the Covid-19 crisis? What have been the consequences of the pandemic for the military instrument? What is the future of civil-military partnership? Finally, in the light of the Covid-19 crisis, what are the capabilities that NATO needs to address new threats?

The WG aimed to answer these questions, devoting a specific attention both to the role of armed forces in front of future similar challenges and to the conditions that can affect and shape the civil-military relationship in confronting multidimensional threats. Relying on the literature and on the exchanging perspectives among members of the WG, abroad consensus arose according to which NATO should firstly examine lessons learnt and vulnerabilities emerged in addressing the pandemic. Several possible suggestions have been discussed and advanced.

Armed forces and pandemics

The WG emphasizes how the role played by the armed forces of NATO's members during the pandemic has been significant. Because of unique skills and operational capabilities, the military instrument contributed to national responses to the crisis and, to a lesser extent, to regional cooperation in the Euro-Atlantic area. NATOs' activities have been structured into measures to protect military personnel, delivering deterrence and defence and providing direct support to civilian authorities in their response to the crisis. The Initial Response phase (January 2020-May 2020) and the General Response phase (June 2020-May 2021) addressed the first waves of the pandemic in Europe, protecting NATO personnel and military capabilities. With the Specific Response phase (which started in June 2021) the main focus has been the vaccination to military personnel.

The WG highlights how NATO armed forces have also played a role in supporting Allies and partners through transportation of medical supplies, deployment of medical personnel, and other logistic tasks. Clearly, there have been similarities (e.g., military as strategic reserve) and differences (building – or not – field hospitals) among states. Bearing in mind the current lively debate on the relationship between EU and NATO, some members of the WG suggested how the above-mentioned differences in the ways through which forces acted during the

pandemic well illustrate different approaches, capabilities and legacies also *within* NATO, going beyond the discussed EU-NATO divide.

Apart from identifying national differences, the WG examines the risk of "stretching" for the military involved in multiple tasks at the same time, within and outside national borders. The evolution of contemporary security and the rising emergence of non-military threats in the post-Cold War era (from pandemics to the fight of transnational organized crime) have fostered the transformation of the armed forces and their assignments. Therefore, the military has been constantly deployed in domestic contexts, in law enforcement or to support civilian authorities in case of natural disasters. For some members of the WG, such trend – which has been dramatically revealed by the Covid crisis – represents a problem for the future of NATO's armed forces that risk to be overstretched in multiple tasks not originally thought for the military. The outsourcing to private actors for specific tasks (e.g., critical infrastructure protection) has been discussed, illustrating risks and opportunities. Concerning the problem of "overstretching" of NATO's armed forces, two elements have been remarked. On the one hand, in a context characterized by limited resources and growing regional and global strategic competition, the simultaneous commitment to very different tasks – In the streets of Paris and Bagdad – can considerably affect the overall effectiveness and sustainability of the forces. On the other hand, the pandemic has exposed the use of armed forces by non-democratic states to enhance public diplomacy (e.g., the so-called "mask diplomacy" by China or the actual deployment of Russian troops to support Italy in the very first weeks of the Covid-crisis) and the needs to contrast them. In sum, the WG emphasizes the relevance of acknowledging the risks of stretching for NATO's armed forces, demanding a strategic reflection over the ways through which we can decouple, combining successfully low and high intensity tasks and properly defining the priorities in front of rising strategic complexity.

On the "sustainability" of the military, the WG examines the impact of the pandemic towards the armed forces, highlighting two main aspects that could be relevant for NATO. The first element attains at the views by public opinion concerning role and image of the armed forces. Some members of the WG point out that, despite military presence in the streets (and, sometimes, public contestation of emergency measures) there were not "negative" or "anti-militaristic" attitudes towards the armed forces. On the whole, the general support of the society is a vital element to understand the future role of the military. The second aspect – which introduces a much broader discussion in the WG – is the civil-military relationship and what political leaders actually want by armed forces.

Pandemics and the future of civil-military partnership

What is the role of the armed forces in the future? What is the utility of the military instrument in the current security environment? States and organizations as NATO, as well as the International Relations (IR) literature, have constantly tried to answer these vital questions. After the pandemics, also due to the rising tasks performed by the armed forces as well as the integration, interoperability, and coordination with civilian actors, the civil-military relations – and their challenges - have attracted rising attention. Along with the opportunity to support civilian authorities with unique operations capabilities in case of crises, the debate has stressed the risk of "securitization", namely the purposeful enlargement of a security agenda by adopting extraordinary measures to contrast threats labelled as vital to national security, and overreliance by political leaders. Paradoxically, several NATO members have contractors in military operations abroad and armed forces patrolling European

cities' neighbourhoods.

The WG 2 discusses two different perspectives that need to be taken into account: the government's views of the usefulness of armed forces to address crises as pandemics and the standpoint of the military that aims to understand how to proper support civilians. Relatedly, the WG identifies four main factors that can affect the civil-military relationship. To better understand the future development of NATO's armed forces, it is necessary to carefully consider all these elements.

First, we should look at the legal context and at the democratic control of armed forces. In other words, the variance (also among NATO members) related the legislation on civilian control as well as on the state of emergency should be examined. Such institutional and legal framework clearly defines and shapes the civil-military relations. Second, legacy and culture also play a crucial role. Indeed, on one hand, NATO members have different operational legacies in terms of domestic employment of armed forces for crisis management, with states that are get used to see troops in the domestic arena, even for law enforcement activities, and others are not. On the other hand, member states have diverse strategic cultures. In fact, public opinion of some countries is featured – for cultural, political and historical reasons – by prudent attitudes in deploying troops, preferring to avoid constantly relying on armed forces abroad and at home. The cultural dimension is relevant also to understand the problematic integration of different mindsets (for instance, "risk management" for the military and "risk aversion" for civilian bureaucracies) in civil-military relations. The third aspect is related to the different models adopted by NATO members to integrate armed forces with actors as national civil protection mechanisms. For instance, during the pandemic, in Italy an army General has been appointed as Special Commissioner for the vaccination campaign. The WG discusses the manifold models of integration, their costs and levels of efficiency. For this reason, the WG3 emphasizes the need to improve simulations, planning, and exercises to foster interoperability. Finally, the last factor that shapes civil-military relationship is threat perception. Indeed, the role of armed forces in the society will be influenced by perceived threats in the security environment. As said, during the pandemic, the main goal for NATO was to avoid that a health crisis would have transformed in a security crisis. Also for this reason, the WG, after having discussed the problem of "strategic cacophony" (very different threat perceptions among NATO members), investigates the possible critical aspects of societal resilience, and – especially – how to measure it. Despite focusing on the significant role of armed forces, the WG substantially agrees in stressing how the military cannot be a substitute of civilians, while the Covid-19 has mainly revealed the crucial function of public education and health systems in keeping societal resilience during crisis.

In sum, after having examined the factors that can shape the future of civil-military relationship in case of crises, the WG focuses on the actual skills and capabilities required by armed forces to provide a more effective support to civilian authority in future pandemic-like scenarios.

Pandemics, NATO and lessons learnt. A long-term perspective

What are the capabilities that NATO needs to effectively address new threats, such as the "weaponization" of a virus or a conflict with a pandemic-like situation? Should NATO be better prepared to carry out operations in a hypothetical new biological environment countering a biological threat?

For answering these vital questions the WG firstly looks at lessons learnt and – especially – at the vulnerability emerged in the ways though which NATO has addresses the Covid-crisis.

The WG points out a puzzling aspect. In fact, NATO had devoted significant attention to pandemics as potential threats, as illustrated by the 2010 Strategic Concept which focused also on civil-military planning in the full spectrum of crises, while developing institutions such as the EADRCC to properly address such future challenges. Yet, despite such efforts, NATO suffered problems of slowness and fragmentation in addressing requests of support by members and partners, with weeks or even months to coordinate and implement effective answers. Despite NATO was (in principle) institutionally and conceptually prepared to address similar crises, some limitations occurred, also for the degree of emergency: e.g., while generally the Coordination Centre addresses three/four requests per year, with the Covid-crisis it was surmounted by almost 30 demands simultaneously. Another problem has been d the level of resources (e.g., with few personnel) devoted to such efforts before pandemic took place in 2020.

In sum, the WG acknowledges the vulnerabilities emerged during the pandemic, stressing three main aspects. First, from NATO's perspective we should bear in mind that although the dramatic humanitarian and social consequences of Covid, this pandemic did not represent a real stress-test as in case of chemical and biological threats mastered by state adversaries. Second, even if the health crisis did not become a security crisis, the general effects of the virus (e.g., social unrest) represent matter of concern that requires to seriously think at how to prevent future crises by better developing capabilities to provide support to civilian authorities. Third, and relatedly, NATO should foster civil-military relationship through integration, coordination and also transparency. In fact, the lack of data sharing can represent a problem to understand the proper ways to address challenges, while enhanced transparency does not represent per se a weakness for a military alliance but rather it could spread trust, promoting a quick recognition of emerging problems and still contributing to deterrence for adversaries.

Conclusions

In a nutshell the WG, after having emphasized the significant role played by armed forces during the pandemics thanks to their unique operational capabilities, has focused on the risks of stretching for the military in front of rising tasks, within national borders and in military operations abroad. Moreover, and relatedly, specific attention has been devoted to identify the legal, cultural, operational and strategic conditions that can affect the relationship between civilian authorities and armed forces in future crisis management interventions. Finally, the vulnerabilities (especially in terms of fragmentation and slowness) emerged during the pandemic have been discussed to highlight lessons learnt for future crises. In this sense, the WG has widely focused on interoperability, coordination, and transparency as crucial elements.

List of acronyms

ACO	Allied Command Operations
ACT	Allied Command Transformation
ACT	Access to COVID-19 Tools
AFRICOM	US Africa Command
APIs	active pharmaceutical ingredients
APEC	Asia-Pacific Economic Cooperation
ARES	Armament Industry European Research
BARDA	Biomedical Advanced Research and Development Authority
BRICS	Brazil, Russia, India, China and South Africa
CARD	Coordinated Annual Review of Defence
CBRN	chemical, biological, radiological and nuclear
CEPS	Centre for European Policy Studies
CSET	Center for Security and Emerging Technology
C-TAP	COVID-19 Technology Access Pool
DIHK	Deutscher Industrie- und Handelskammertag
DIME	Diplomatic, Informational, Military, and Economic
DIME-FIL	Diplomatic, Informational, Military, and Economic, Finance, Intelligence and Law Enforcement
DNAT	NATO Parliamentary Assembly
DoD	Department of Defence
DW	Deutsche Welle
EACP	Euro-Atlantic Partnership Council

EADCC	Euro-Atlantic Disaster Co-ordination Centre
EADRCC	Euro-Atlantic Disaster Response Coordination Centre
EAR	Export Administration Regulations
EC	European Commission
ECA	European Court of Auditors
ECDC	European Centre for Disease Prevention and Control
ECFR	European Council on Foreign Relations
EDF	European Defence Fund
EEAS	European External Action Service
EMA	European Medicines Agency
EP	European Parliament
EPF	European Peace Facility
EPRS	European Parliamentary Research Service
EU	European Union
EUISS	European Union Institute for Security Studies
EUMS	European Union Military Staff
EUR	Euro
EWRS	Early Warning and Response System
FIL	Finance, Intelligence, and Law Enforcement
GBP	British pound sterling
GDP	Gross Domestic Product
GHRP	Global Humanitarian Response Plan
GPMB	Global Preparedness Monitoring Board

GSCs	Global Supply Chains
GVCs	Global Value Chains
HERA	Health Emergency Preparedness and Response Authority
HSC	Health Security Committee
IAI	Istituto Affari Internazionali
IFRI	Institut français des relations internationales
IHR	International Health Regulations
IMF	International Monetary Fund
IOs	international organizations
IPRs	intellectual property rights
IR	International Relations
ISSMI	Istituto Superiore di Stato Maggiore Interforze
ITAR	International Traffic in Arms Regulations
JCOA	Joint and Coalition Operational Analysis
JIMM	Joint, Interagency, Intergovernmental, and Multinational
MIDFIELD	Military, Informational, Diplomatic, Financial, Intelligence, Economic, Law and Development
MoD	Ministry of Defence
MPCC	Military Planning and Conduct Capability
NDC	NATO Defense College
NPIs	non-pharmaceutical interventions
NSPA	NATO Support and Procurement Agency
OECD	Organization for Economic Co-operation and Development
PESCO	Permanent Structured Cooperation

PHEIC	Public Health Emergency of International Concern
PPE	personal protective equipment
R&D	research and development
RDIF	Russian Direct Investment Fund
RND	RedaktionsNetzwerk Deutschland
SCRIMPED	Strategic Communications, Resilience, Intelligence, Military, Political, Economic, Diplomatic, Finance, Law Enforcement, Digital
SDGs	Sustainable Development Goals
SNV	Stiftung Neue Verantwortung
STO	Science and Technology Organization
TFEU	Treaty on the Functioning of the European Union
TRIPS	Trade-Related Aspects of Intellectual Property Rights
UK	United Kingdom
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
UNGA	United Nations General Assembly
UPU	Universal Postal Union
US	United States
USD	United States dollar
WG	Working Group
WHO	World Health Organization
WIPO	World Intellectual Property Organization


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