




Strategic Shifts and NATO's New Strategic Concept

Other Publication

Author(s):

Gilli, Andrea; [Gilli, Mauro](#) ; Grgić, Gorana; Henke, Marina; Lanoszka, Alexander; Meijer, Hugo; Scaglioli, Lucrezia; [Silove, Nina](#) ; Simón, Luis; [Smeets, Max Willem Eline](#) 

Publication date:

2022-06

Permanent link:

<https://doi.org/10.3929/ethz-b-000560631>

Rights / license:

[Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International](#)

Originally published in:

NDC Research Paper 24



Research Division

RESEARCH DIVISION
NATO DEFENSE COLLEGE – ROME

Strategic Shifts and NATO's new Strategic Concept

Andrea Gilli, Mauro Gilli, Gorana Grgić, Marina Henke,
Alexander Lanoszka, Hugo Meijer, Lucrezia Scaglioli,
Nina Silove, Luis Simón and Max Smeets

NDC RESEARCH PAPER

No. 24 – June 2022



Strategic Shifts and NATO's new Strategic Concept

**Andrea Gilli, Mauro Gilli, Gorana Grgić, Marina Henke,
Alexander Lanoszka, Hugo Meijer, Lucrezia Scaglioli,
Nina Silove, Luis Simón and Max Smeets**

NATO Defense College – NDC Research Papers Series

Series editor: Thierry Tardy
Copy-editing: Mary Di Martino

NDC Research Paper 24 – 2022
Strategic Shifts and NATO's new Strategic Concept

Keywords

Strategic Concept, Core Tasks, Ukraine War, Covid-19, NATO2030, Collective Defense, Crisis Management, Cooperative Security

Nota Bene

The views expressed in this *NDC Research Paper* are the responsibility of the author(s) and do not necessarily reflect the opinions of the NATO Defense College, the North Atlantic Treaty Organization, or any other institution represented by the contributor(s).

ISSN: **2618-0057**
ISSN (online): **2618-0251**



The NATO Defense College applies the Creative Commons Licence “Attribution-NonCommercial-NoDerivs” (CC-BY-NC-ND)

Limited copies of this NDC Research Paper are available and may be obtained directly from
NATO Defense College, Research Division
Via Giorgio Pelosi, 1 - 00143 Rome, Italy
E-mail: publications@ndc.nato.int
Website: <http://www.ndc.nato.int>
Follow us on twitter: https://twitter.com/NDC_Research

Printed and bound by <http://www.lightskeyconsulting.com/>

Table of contents

Contributors	ix
List of abbreviations	xi
Acknowledgements	xi
Foreword	xi
Introduction	01
1 From 2010 to 2022: what has changed?	05
2 Trends and shocks	11
3 Trends, shocks and collective defense	23
4 Trends, shocks and crisis management	31
5 Trends, shocks and cooperative security	39
6 Dilemmas, challenges and tensions for NATO	45
Conclusion	53

Contributors

Benedetta Berti is Head of the Policy Planning Unit in the Office of the Secretary General at NATO. Previously she held research and teaching positions at West Point, the Institute for National Security Studies and the Foreign Policy Research Institute. She is the author of four books, including *Armed Political Organizations. From Conflict to Integration* (Johns Hopkins University Press, 2013) and her work has appeared in Al-Jazeera, *Foreign Policy*, *Foreign Affairs*, *the Wall Street Journal* and *The New York Times*.

Andrea Gilli is Senior Researcher at the NATO Defense College where he works on issues related to technological change and military innovation. He has been visiting and post-doctoral fellow at Johns Hopkins University and Columbia University as well as Stanford University (where he remains an Affiliate) and Harvard University. Andrea holds a BA from the University of Turin, a MSc from the London School of Economics and a PhD from the European University Institute.

Mauro Gilli is a Senior Researcher in Military Technology and International Security in the Center for Security Studies (CSS) at the Swiss Federal Institute of Technology (ETH Zurich). He received his PhD in Political Science from Northwestern University in 2015, with major in International Relations and minor in Methodology. He has an MA from the School of Advanced International Studies, Johns Hopkins University, and a BA from the University of Turin. Before joining CSS, he was a post-doctoral fellow at the Dickey Center, Dartmouth College.

Gorana Grgić is a jointly appointed Senior Lecturer at the Department of Government and International Relations and the United States Studies Centre at the University of Sydney. She is the Project Lead of an ERASMUS+ Jean Monnet grant project on the Global EU at the University of Sydney. Gorana will be joining the Hertie School's Centre for International Security as the 2022-2023 Research Fellow in Grand Strategy. In 2021 Gorana was the Partners Across the Globe Fellow at the NATO Defense College, while in 2018-2019 she was a Visiting Fellow at the Harvard Center for European Studies.

Marina Henke is Professor of International Relations at the Hertie School and Director of the Centre for International Security. She researches and publishes on military interventions, peacekeeping, nuclear security and European security and defense policy. Before joining the Hertie School, she was an Associate Professor (with tenure) at Northwestern University, specialising in international relations, as well as at Princeton University where she was a Lecturer and post-doctoral Research Associate at the Woodrow Wilson School of Public and International Affairs. She holds a PhD in Politics and Public Policy from Princeton University.

Alexander Lanoszka is Assistant Professor in the Department of Political Science at the University of Waterloo and Ernest Bevin Fellow at the Council on Geostrategy. His research addresses alliance politics and military strategy. He has published in such peer-reviewed journals as *International Security*, *International Affairs*, and *Security Studies*. He has also co-written policy monographs on Baltic security and Taiwanese defence strategy. His books include *Atomic Assurance: The Alliance Politics of Nuclear Proliferation* and *Military Alliances in the Twenty-First Century*. He received his PhD from Princeton University.

Hugo Meijer is CNRS Research Fellow at Sciences Po, Center for International Studies (CERI, Paris) and the Founding Director of *The European Initiative for Security Studies* (EISS). He is also Senior Fellow at the Centre for Security, Diplomacy and Strategy (CSDS) in Brussels, and Honorary Researcher at the Centre for War and Diplomacy, Lancaster University. His recent publications include *Awakening to China's Rise. European Foreign and Security Policies toward the People's Republic of China* (Oxford University Press, 2022) and "Illusions of Autonomy: Why Europe Cannot Provide for Its Security if the United States Pulls Back", with Stephen G. Brooks (in *International Security*, Vol.45, Iss.4, Spring 2021).

Lucrezia Scaglioli is a Research Assistant at the NATO Defense College. Prior to the NDC she worked at Supreme Headquarters Allied Powers Europe (SHAPE) in the Strategic Development of Forces Division, where she focused on Allied Maritime Posture and topics on maritime and amphibious strategy. She holds a double degree Master of Arts in International Affairs from Johns Hopkins University School of Advanced International Studies (SAIS) and Alma Mater Studiorum, University of Bologna.

Nina Silove is a Senior Researcher in the Center for Security Studies (CSS) at the Swiss

Federal Institute of Technology (ETH Zürich). Her research focuses on grand strategy, strategic planning, and US policy toward the Asia-Pacific. She holds a DPhil (PhD) in International Relations from the University of Oxford, and degrees in Social Science and Law with first class honors from the University of Technology, Sydney. Prior to arriving at ETH Zürich, she held a pre-doctoral and then post-doctoral fellowship from Harvard University and a postdoctoral fellowship from Stanford University, among other positions. Her research has appeared in *International Security* and *Security Studies*.

Luis Simón is Director of the Centre for Security, Diplomacy and Strategy (CSDS) at the VUB's School of Governance, and director of the Brussels office of the Elcano Royal Institute. He is also a member of the editorial board of *Parameters: The US Army War College Quarterly*. Luis received his PhD from the University of London, and held a post-doctoral fellowship at the Saltzman Institute for War and Peace Studies (Columbia University). His research has appeared in such journals as *Security Studies*, *International Affairs*, *The Journal of Strategic Studies*, *Geopolitics*, *Survival*, and *The RUSI Journal*.

Max Smeets is a Senior Researcher at the Center for Security Studies (CSS) at ETH Zurich and Director of the European Cyber Conflict Research Initiative. He is the author of *No Shortcuts: Why States Struggle to Develop a Military Cyber-Force* (Oxford University Press & Hurst, 2022) and co-editor of *Deter, Disrupt or Deceive? Assessing Cyber Conflict as an Intelligence Contest*, with Robert Chesney (Georgetown University Press, 2023), and published widely on cyber statecraft, strategy and risk. He was previously a post-doctoral fellow and lecturer at Stanford University CISAC and a College Lecturer at Keble College, University of Oxford.

List of abbreviations

AOR	Area Of Responsibility
BRI	Belt and Road Initiative
C4	Command, Control, Communication, Computer
DIANA	Defense Innovation Accelerator for the North Atlantic
EDA	European Defense Agency
EDTs	Emerging and Disruptive Technologies
GDP	Gross Domestic Product
ICI	Istanbul Cooperation Initiative
ICT	Information and Communication Technologies
ISIS	Islamic State of Iraq and Syria
MD	Mediterranean Dialogue
MENA	Middle East and North Africa
MIPS	Million Instructions Per Second
NATO	North Atlantic Treaty Organization
OEM	Original Equipment Manufacturers
PAG	Partners Across the Globe
PfP	Partnership for Peace
PLAN	People's Liberation Army Navy
PPP	Purchasing Power Parity
WFP	World Food Programme

Acknowledgements

In late 2019, the NATO Defense College organized a workshop titled “Ghost Concept: NATO Future Strategy at 2030”. Its rationale held that, sooner or later, debate about a new Strategic Concept for the Alliance had to begin. In fact, a few days before our workshop, at the NATO Leaders’ Meeting in London, NATO Secretary General Jens Stoltenberg announced the beginning of a reflection process on the future of the Alliance, towards 2030. In other words, the debate for a new Strategic Concept had indeed begun. In the following months, NATO HQ launched the NATO2030 process and organized a wide range of activities, including the establishment of a Reflection Group for NATO2030. The Research Division of the NATO Defense College directly and indirectly contributed to some of these activities.

Despite the COVID pandemic, the Ghost Concept project continued. In 2021, the Research Division launched a series of closed-door online meetings with participants of the 2019 event. These meetings generated discussions and ideas about the future trajectory of the Alliance. Alongside a workshop held in December 2021 at the NATO Defense College, these meetings and debates are reflected in the present collegial document.

We would like to thank all those who participated in the College’s two in-person meetings as well in the online meetings organized by the Center for Security Studies (CSS) ETH Zürich. We would like to further thank all others who contributed with feedback, comments, and ideas, in particular (in alphabetical order): Benedetta Berti, Claudio Bisogniero, Sandro Carniel, Gordon B. “Skip” Davis Jr, Pierre De Dreuzu, Ruben-Erik Diaz-Plaja, Giampaolo Di Paola, Robert Dresen, Jan Havranek, Timo Koster, Barbora Maronkova, Denis Mercier, Antonio Missiroli, Michael Rühle, Marietje Schaake, and Nathalie Tocci.

Andrea Gilli and Thierry Tardy

Foreword

At the 2022 Madrid Summit, NATO Leaders are adopting a new Strategic Concept – the Alliance’s top political guidance. Second only to the North Atlantic Treaty itself, the Strategic Concept is a key document for NATO. It reaffirms the Alliance’s values and purpose, provides a collective assessment of the security environment and drives its strategic adaptation.

In its timely analysis, the NATO Defense College’s Research Division emphasizes the systemic shifts occurring in the Alliance’s broader strategic landscape and highlights the need for NATO’s new strategy to reflect them in full. The report rightly states that the central assumptions that shaped NATO’s post-Cold War Strategic Concepts – dating, respectively, back to 1991, 1999 and 2010 – have been either undermined or shattered over the past decade. In particular, the notions of the Euro-Atlantic area being at peace, the absence of Great Power competition globally and the predictable and cooperative nature of the international security order seem ill-suited to describe the current security environment.

Today, Russia’s horrific war of aggression against Ukraine brought all-out war back to Europe, contributing to a broader deterioration of Euro-Atlantic peace and security. More broadly, rising strategic competition and an increasing push-back against the rules-based international order characterize the global security environment. The paper zooms in on the transformative impact of strategic competition on the Alliance’s broader security environment and further highlights how the rise of China, technological acceleration and climate change will profoundly reshape the world and impact on NATO’s core tasks and priorities.

The authors stress that “[t]he current phase in NATO’s existence is largely unique and closer to the challenges the Alliance faced upon its foundation rather than those that emerged after the end of the Cold War”. At the same time, they also highlight that the world is now fundamentally different. NATO faces non-traditional security threats and challenges that are global, interconnected, and transnational: from terrorism, to cyber threats, and from energy vulnerabilities and dependencies to the impact of climate change on Allied security.

This is why the 2022 Strategic Concept must provide guidance to navigate the complexity

of the current security environment and prepare the Alliance for a more contested and competitive world. One of the report's main policy takeaways is that the Alliance is yet again at a strategic juncture in its history and this will require prioritization. Specifically, NATO will need to continue bolstering its deterrence and defense posture, which is essential to ensuring the collective defense of Allies. At the same time, the Alliance will need to continue investing in crisis management and cooperative security while adapting these tasks to meet its changing security needs. A second important notion reflected in the analysis is that NATO will need to place a strong emphasis on retaining and strengthening its technological edge to both stay ahead of its potential competitors, but also to fully leverage the opportunities emerging technologies can bring.

In readying itself for the future, NATO should build on the considerable military and political adaptation it has undertaken over the past decade. This is aimed at reinforcing the Alliance's deterrence and defense posture, strengthening and broadening its political role, investing in resilience, sharpening its technological edge and strengthening its global approach and cooperation with partners, both in its neighborhood and further afield. It should also reaffirm and strengthen its foundations: namely its common values – democracy, individual freedom, human rights and the rule of law – and the essential role of the transatlantic bond to ensuring the security and defense of Allies.

Benedetta Berti
Head, Policy Planning Unit
NATO Headquarters

Introduction

NATO currently faces a fundamental challenge. Following the collapse of the Soviet Union, NATO adopted a *de facto* strategy of political, geographical and functional extension, welcoming new members, launching operations in new regions and multiplying its activities to address new low-intensity security threats.¹ However, the pillars on which this strategy rested are now weakening. Today, strategic competition has returned and NATO's military primacy is eroding, as much due to China's impressive military modernization as because of the diffusion of military power enabled by globalization.² Likewise, the liberal international order which allowed NATO to endure an uncertain military balance and a competitive international system during the Cold War is also under pressure. Free trade is under attack, democracy is receding, financial stability is harder to maintain and, last but not least, a seismic redistribution of wealth and power away from the Euro-Atlantic area and towards the Asia-Pacific is underway.³ Lastly, the non-traditional security threats which characterized the post-Cold War era remain, having even expanded in number and intensity.⁴

The complexity of the situation explains why in June 2022 NATO has presented a new Strategic Concept. The next decade requires NATO Allies to craft a new common path. However, the nature, magnitude, and extension of the changes at play in the international system render this document both necessary and difficult to elaborate. In order to reflect on the difficulties related to drafting and implementing a new Strategic Concept, this *Research Paper* analyzes the major challenges that NATO will face in the years to come. The core of the analysis examines the direct and indirect impacts of three major drivers – the rise of China, technological acceleration and climate change – on NATO's current core tasks and identifies the resulting tensions and dilemmas that these trends will raise for Allies. For this

1 M. Kroenig, *The return of great power rivalry: democracy versus autocracy from the ancient world to the US and China*, Oxford University Press, Oxford, 2020.

2 S. G. Brooks and W. C. Wohlforth, "Power, globalization, and the end of the Cold War: reevaluating a landmark case for ideas", *International Security*, Vol.25, No.3, Winter 2000/01, pp.5-53; Office of the United States Secretary of Defense, "Military and security developments involving the People's Republic of China 2021: annual report to Congress", US Department of Defense, Washington, DC, 2021.

3 L. Simón, "Europe, the rise of Asia and the future of the transatlantic relationship", *International Affairs*, Vol.91, No.5, 2015, pp.269-289; F. Liu, "The recalibration of Chinese assertiveness: China's responses to the Indo-Pacific challenge", *International Affairs*, Vol.96, No.1, 2020, pp.9-27.

4 F. A. Gerdes, *ISIS: a history*, Princeton University Press, Princeton, NJ, 2021.

purpose, we proceed in five steps.

First, NATO is neither a nation state nor an institution like the European Union, with a wide set of instruments, resources and capabilities. NATO is instead a multilateral organization whose main contributions stem from individual Allies' assets. To understand the implications of the transformations at hand, we hence focus on NATO's three current core tasks – namely, collective defense, crisis management and cooperative security. These are the political, analytical, and functional categories through which NATO's multilateral activities are divided. This focus enables us to circumscribe and clarify where and why major changes in the international system are affecting NATO's current configuration – including whether these core tasks need to be rethought or new ones added.

Second, the international system is changing deeply and widely. We cannot consider all sources of change nor all the potential dynamics at play. Building eclectically from the concept of competitive strategy, we consider the ways in which three major forces – the rise of China, technological acceleration, and climate change – may alter the competitive position of NATO in the medium-to-long term. Our approach is analytical: our narrow focus can help better understand the consequences for the Transatlantic Alliance. These three forces deserve, however, also attention because, on the one hand, they are a product of globalization and, on the other hand, they are weakening globalization.⁵ To keep our analysis current, we also consider the combined effects of the Covid-19 pandemic and the war in Ukraine as secondary factors that will alter and interact with the three trends.

Third, we consider these variables within the context of each of NATO's current core tasks. Overall, we find that the rise of China, technological acceleration and climate change will complicate NATO's ability to fulfil its current core tasks. For instance, NATO's nuclear deterrence posture, which rests primarily on the US nuclear arsenal, will be increasingly stretched thin by China's expanding nuclear capabilities, thereby complicating collective defense.⁶ Similarly, technological acceleration may generate and exacerbate crises around the globe, making crisis management more difficult.⁷ Finally, cooperative security will likely become more demanding in a more competitive world. Even when tackling global

5 *Op. cit.*, *The return of great power rivalry: democracy versus autocracy from the ancient world to the US and China*; S. Fischer *et al.*, "Technological change and grand strategy", in T. Balzacq and R. R. Krebs (eds.), *Oxford handbook on grand strategy*, Oxford University Press, Oxford, 2021, pp.221-239; A. Gilli *et al.*, "Climate change and American primacy: the effect of warming oceans on US naval power in the North Atlantic", *Working Paper*, 2022.

6 H. M. Kristensen and M. Korda, "Chinese nuclear forces, 2020", *Bulletin of the atomic scientists*, Vol.76, No.6, 2020, pp.443-457; J. M. Smith and P. J. Bolt (eds.) *China's strategic arsenal: worldview, doctrine, and systems*, Georgetown University Press, Washington, DC, 2021; *Op. cit.*, "Military and security developments involving the People's Republic of China 2021: annual report to Congress".

7 E. Brynjolfsson and A. McAfee, *The second machine age: work, progress, and prosperity in a time of brilliant technologies*, W. W. Norton & Company, New York, NY, 2014; K. Schwab, *The fourth industrial revolution*, Portfolio Penguin, London, 2018.

challenges like climate change, countries will more actively compete for external influence – whether in regional security architectures, in other countries’ internal affairs, or both.⁸ NATO Allies will, thus, face a growing number of more diverse threats.

Fourth, we examine the indirect, complex, and non-intuitive implications that each trend carries. Our analysis suggests that NATO will face difficult trade-offs and dilemmas in the future. For instance, while the war in Ukraine directly raises the importance of collective defense, through its effects on the prices of energy, food and commodities, it fosters instability around the world and thus calls NATO to pay additional attention to crisis management and cooperative security. Similarly, competition with China and climate change are somehow in tension, and NATO Allies will have to decide what to prioritize.

Finally, we conclude with some considerations. We believe, given the nature of the changes, that NATO should strengthen its cohesion and political consultation mechanisms. We suggest that NATO reinforces its internal analysis and research capabilities in order to understand in depth the challenges ahead. Finally, we discuss the broader implications for NATO’s core tasks.

8 *Op. cit.*, “Climate change and American primacy: the effect of warming oceans on US naval power in the North Atlantic”; H. Brands, *The twilight struggle: what the Cold War teaches us about great power rivalry today*, Yale University Press, New Haven, CT, 2022.

NATO from 2010 to 2022: what has changed?

In this section, we first discuss NATO's role within the liberal international order, then NATO's post-Cold War grand strategy, and finally what changes are undermining it.

NATO, the liberal international order and the post-Cold War

NATO is a core and founding pillar of the post-World War II liberal international order.⁹ Throughout the Cold War, the liberal international order was based on a set of synergic and self-reinforcing political, economic, and military mechanisms: NATO collective defense protected democratic institutions and thus individual rights;¹⁰ individual rights enabled economic growth and legitimated economic integration;¹¹ higher economic growth bolstered collective defense and faster technological acceleration.¹²

In 1989, the fall of the Berlin Wall vindicated the liberal international order, which then spread around the world. Globalization connected most countries' economies, while democratization diffused respect for individual rights, personal freedoms, and claims for national autonomy.¹³ This massive and rapid transition, however, also brought instability, particularly in the form of ethno-religious clashes and terrorism. In order to address these new and emerging challenges, NATO adopted a *de facto* grand strategy based on political, geographical and functional extension which was made possible by the lack of strategic

9 J. Ikenberry, *After victory: institutions, strategic restraint, and the rebuilding of order after major wars*, Princeton University Press, Princeton, NJ, 2019.

10 J. Ruggie, "International regimes, transactions, and change: embedded liberalism in the postwar economic order", *International Organization*, Vol.36, No.2, 1982.

11 S. Sloan, *Defense of the West: NATO, the European Union and the transatlantic bargain*, Manchester University Press, Manchester, 2016.

12 A. W. Marshall, "Long-term competition with the Soviets: a framework for strategic analysis", RAND Corporation, Santa Monica, CA, 1972.

13 R. Jervis, *American foreign policy in a new era*, Routledge, 2005; S. G. Brooks and W. C. Wohlforth, "Power, globalization, and the end of the Cold War: reevaluating a landmark case for ideas", *International Security*, Vol.25, No.3, Winter 2000/01, pp.5-53.

competition and by NATO's military primacy.¹⁴ First, NATO's open-door policy enabled, during the Cold War, the increase of the Allies from 12 to 16. After the fall of the Berlin Wall, however, this political extension both accelerated and acquired a new dimension: Allies rose to 30 and the Alliance added four partnership schemes, now including 40 non-Allies.¹⁵ The increase in both Allies and Partners went hand-in-hand with an expansion of the geographic areas within which NATO conducted operations. In the parlance of the time, NATO went "out-of-area".¹⁶ During the Cold War, the Alliance was anchored by the Central Front, the Mediterranean, the High North and the Atlantic; after the fall of the Berlin Wall, NATO's operations moved eastward and southward. Initially, NATO stepped into the Western Balkans (Bosnia-Herzegovina and Kosovo), before then moving into Central Asia (Afghanistan), the Middle East (Iraq), North Africa (Libya) and the Gulf of Aden.¹⁷ Recently, NATO has strengthened further its presence in the Baltics, East and the South-east, including the Black Sea region. NATO's political and geographical expansion logically entailed an enlargement of the functions of the Alliance: moving away from territorial defense after 1989, NATO Allies launched a series of out-of-area operations spanning from humanitarian interventions to peace-keeping and counter-insurgency, counter-terrorism, capacity-building and security-sector reform and anti-piracy. At the same time, NATO stepped into new domains, including cyber defense, hybrid threats, energy security, technological innovation, arms control, capacity-building and joint intelligence, among others.¹⁸

A changing strategic environment

Today, NATO finds itself in a difficult situation closer to the challenges it faced upon its foundation. The factors that enabled NATO's post-Cold War expansion – military primacy and lack of strategic competition – are eroding. At the same time, the liberal international

14 T. A. Sayle, *Enduring alliance: a history of NATO and the postwar global order*, Cornell University Press, Ithaca, NY, 2019.

15 These are the Partnership for Peace (PfP), Mediterranean Dialogue (MD), Istanbul Cooperation Initiative (ICI), and Partners across the Globe (PAG). These partnership systems enabled better political-diplomatic relations. H. Edström *et al.* (eds.), *NATO: the power of partnerships*, Palgrave Macmillan, Basingstoke, 2011.

16 E. Williams, "Out of area and very much in business? NATO, the US, and the Post-9/11 International Security Environment", *Comparative Strategy*, Vol.27, No.1, 2008, pp.65-78.

17 R. Cohen, "NATO, expanding Bosnia role, strikes a Serbian base in Croatia", *The New York Times*, 22 November 1994.

18 *Op. cit.*, "NATO, expanding Bosnia role, strikes a Serbian base in Croatia"; NATO, *The Alliance's Strategic Concept*, 2010; B. Scott, "NATO after Iraq: out of sector, or out of business?", *European Security*, Vol.2, No.2, 1993, pp.227-43; *Op. cit.*, "Out of area and very much in business? NATO, the US, and the Post-9/11 international security environment".

order which enabled the Atlantic Alliance to face strategic competition in the past is under attack.

NATO's military primacy is being questioned. In quantitative terms, China's military modernization represents the primary challenge: three decades ago, the People's Liberation Army Navy (PLAN) could not defend its coasts; now it possesses the largest fleet in the world.¹⁹ In qualitative terms, the spread and emergence of new advanced technologies makes it hard for NATO Allies to preserve their technological superiority. Consider countries like Iran or North Korea which, over the past few decades, have been able to develop missile or cyber capabilities threatening NATO Allies or international security more in general.²⁰

Similarly, international politics is no longer characterized by cooperative relations: most prominently, over the past two decades, Russia, China and Iran have worked assiduously to alter regional orders in Europe, East Asia and the Middle East.²¹ This return of Great Powers' competition challenges NATO's post-Cold War grand strategy. During the Cold War, NATO could handle an uncertain military balance in the context of intense strategic competition, thanks mainly to the support of the liberal international order.²² This is, however, decreasingly possible, as the liberal international order is also weakening.²³ Globalization is under attack as many states oppose free trade while multiple governments increasingly protect national champions and technology sectors. Democracy is also receding, not only around the world but within the Euro-Atlantic community itself. Financial stability and macroeconomic cooperation are more difficult to maintain and, over the past decades, have generated many discontents. Additionally, the strategic, economic, and technological centrality of the Euro-Atlantic region, which stood as a defining feature of the international system for centuries, is now shifting to the Indo-Pacific.

19 The White House, "National security strategy of the United States of America", Washington, DC, December 2017.

20 T. Sharp, "Theorizing cyber coercion: the 2014 North Korean operation against Sony", *Journal of Strategic Studies*, Vol.40, Iss.7, pp.898-926, 2017; H. Elbahtimy, "Ballistic and cruise missiles in the Middle East: the current landscape and options for arms control", International Institute for Strategic Studies, London, January 2022.

21 O. Jonsson, *The Russian understanding of war: blurring the lines between war and peace*, Georgetown University press, Washington, DC, 2019; A. Chubb, "PRC assertiveness in the South China sea: measuring continuity and change, 1970-2015", *International Security*, Vol.45, No.3, 2021, pp.79-121; A. L. Friedberg, "Competing with China", *Survival*, Vol.60, No.3, 2018, pp.7-64; N. Rolland, "China's vision for a new world order", *NBR Special Report* No.83, January 2020; N. Rolland (ed.), "An emerging China-centric order: China's vision for a new world order in practice", *NBR Special Report* No.87, August 2020; R. Doshi, *The long game: China's grand strategy to displace American order*, Oxford University Press, Oxford, 2021.

22 *Op. cit.* *Enduring alliance: a history of NATO and the postwar global order*; M. Ryan, *War transformed the future of twenty-first-century great power competition and conflict*, Naval Institute Press, Annapolis, MA, 2020.

23 *Op. cit.*, "A strategic odyssey: constancy of purpose and strategy-making in NATO, 1949-2019".

NATO's core tasks

NATO is experiencing a critical juncture in its history. This raises important questions about the Alliance's new Strategic Concept, its future grand strategy, and the Alliance's goals for the next decade. Some recommend that NATO should focus on resilience.²⁴ Others believe NATO should devote itself to arms control.²⁵ According to others still, NATO should retrench and center the Alliance around its original mission of collective defense.²⁶ In order to understand what NATO should do, we believe it is first important to describe what NATO currently does.

First, and foremost, NATO provides security in two regions on the frontiers of the Euro-Atlantic – namely, the East and the South.²⁷ In both regions, the Alliance faces a plurality of challenges and threats, spanning nuclear deployments and proliferation to conventional military threats, hybrid forces, and non-state actors.²⁸ In the East, the threat primarily emanates from a single actor, namely Russia. In the South, NATO faces challenges from multiple actors – Iran, Hezbollah, ISIS and other terrorist groups – and from “pervasive instability”.²⁹

In these two areas, NATO provides security through instruments developed under the rubric of its core tasks: the analytical, functional and political division of the Alliance's activities.³⁰ Historically, NATO added its core tasks through its primary strategic document, the Strategic Concept and currently, NATO has three core tasks.³¹ Collective defense entails mutual assistance among Allies against a foreign attack or any emerging security challenge that threatens a single Ally or the Alliance as a whole in their territorial integrity or political independence.³² Collective defense dates back to the Cold War and is the foundational

24 J. Levy, “The best defense: why NATO should invest in resilience”, Atlantic Council, 10 June 2021.

25 D. P. Jankowski, “NATO and the future of arms control”, *NDC Research Paper* No.21, NATO Defense College, Rome, 2021.

26 C. Coker, “Why NATO should return home. The case for a twenty-first century alliance”, *The RUSI Journal*, Vol.153, No.4, 2008, p.6-11.

27 C. S. Gray, “Inescapable geography”, *Journal of Strategic Studies*, Vol.22, No.2-3, 1999, pp.161-177.

28 C. Calmels, “NATO's 360-degree approach to security: alliance cohesion and adaptation after the Crimean crisis”, *European Security*, 2020, Vol.29, Iss.4, pp.416-435.

29 T. Tardy, “NATO's sub-strategic role in the Middle-East and North Africa”, German Marshall Fund of the United States, 11 February 2022.

30 *Op. cit.*, *Enduring alliance: a history of NATO and the postwar global order*.

31 G. W. Pedlow, “NATO strategy documents: 1949-1969”, NATO International Staff Central Archives; D. Ruiz-Palmer, “A strategic odyssey: constancy of purpose and strategy-making in NATO, 1949-2019”, *NDC Research Paper* No.3, NATO Defense College, Rome, June 2019.

32 R. Rupp, “NATO 1949 and NATO 2000: from collective defense toward collective security”, *Journal of Strategic Studies*, Vol.23, Iss.3, 2000, pp.154-176.

mission of the Alliance, enshrined in Article 5 of the Washington Treaty. After Russia's illegal annexation of Crimea and its military occupation of the Donbass region, collective defense has reacquired its past preeminence.

Introduced in the 1991 Strategic Concept, crisis management consists in addressing politically and militarily the full spectrum of crises that could impact the security of the Alliance. This includes managing crises before they escalate into a conflict, intervening in ongoing conflicts to impede belligerents, and consolidating stability in post-conflict situations. Crisis management has initially contributed to stabilize Central and Eastern Europe after the end of the Cold War. Following NATO's operations in the Western Balkans, the Alliance has then conducted crisis management in Libya and Afghanistan – admittedly with uncertain results.³³

Finally, cooperative security was introduced with the 2010 Strategic Concept and involves building relations with non-NATO states in order to preserve the Alliance's security. This entails political and diplomatic relations and capacity-building to support NATO's crisis management activities as well as common threats and challenges, including terrorism and cyber security issues. For instance, by beefing up a partner's cyber defenses, NATO can prevent malwares from spreading widely after a cyber-attack.³⁴

33 M. Rühle, "Crisis management in NATO", *European Security*, Vol.2, No.4, 1993, pp.491-501; *Op. cit.*, "NATO strategy documents: 1949-1969".

34 T. Flockhart, "Cooperative security: NATO's partnership policy in a changing world", *DIIS Report*, No.1, 2014; H. Edström *et al.* (eds.), *NATO: the power of partnerships*, Palgrave Macmillan, Basingstoke, 2011.

Trends and shocks

The liberal international order is weakening and the foundations of NATO's post-Cold War grand strategy are eroding. In this section, in order to understand the implications of these major changes, we identify three forces which we believe are likely to affect strategic competition in the medium-to-long term: the rise of China, technological acceleration and climate change. Next, we discuss two recent exogenous shocks, the Covid-19 pandemic and Russia's war against Ukraine, which are also likely to bear significant consequences for international affairs and for NATO. Finally, we clarify our methodology and assumptions to understand the impact on NATO.

Competitive strategy and major forces

In order to understand how the transformations at play will affect NATO, we draw from the concept of competitive strategy.³⁵ This approach suggests that competitors differ in terms of resources and capabilities, of values and cultures, and of institutions and processes. Competitive strategy postulates that such differences fundamentally shape the way strategic competition unfolds: winners must exploit their competitive advantages while leveraging their adversaries' strategic disadvantages (and vice-versa).³⁶ Strategic competition is not only informed by competitors' goals, actions, and capabilities but also by more profound forces and variables that affect its overall structure.³⁷ For instance, in commercial markets the customer base, downstream complementors, and upstream suppliers can each affect strategic competition, thus enabling some companies to succeed while forcing others to struggle or even fail.³⁸ Similarly, major changes affecting this broader ecosystem can equally

35 M. E. Porter, *Competitive strategy: techniques for analyzing industries and competitors*, Free Press, New York, NY, 2008.

36 *Ibid.*

37 T. G. Mahnken (ed.), *Net assessment and military strategy: retrospective and prospective essays*, Cambria University Press, Amherst, NY, 2020.

38 R. Adner *et al.*, *Collaboration and competition in business ecosystems*, Emerald Publishing Limited, Bingley, UK, 2013.

affect strategic competition at the international level.³⁹ Our goal is to understand how key variables may affect the strategic environment that NATO will face in the coming years.

We live in a complex and dynamic world, where several forces, factors and dynamics affect strategic competition. We focus on three in particular: the rise of China, technological acceleration and climate change. Our choice is rooted in three logics. First, these three forces have been long discussed at the NATO level and are of high salience for the Alliance.⁴⁰ Second, these forces are relatively independent from governments' political decisions, including those of Allies and NATO's competitors. Thus, these forces will likely impact the international system, international security, and NATO irrespective of the actions taken by NATO Allies and their adversaries.⁴¹ Finally, these trends capture the most important transformations of our time with respect to globalization. Globalization lifted billions of people out of poverty – including in China, thereby contributing to the country's economic, technological and military rise. Technological acceleration is in turn the byproduct of ever-expanding markets, the increasing exploitation of comparative advantages, and the deregulation of information communication technologies (ICT) and corporate investments in hardware and software. Finally, climate change is largely the product of ever more wealthy societies consuming ever more sources and therefore polluting and depleting natural resources at an ever-greater pace. Each of these three trends, though, are weakening globalization: China's mercantilist approach and assertive foreign policy threatens international trade; technological acceleration is strengthening digital authoritarianism; climate change is questioning some of the very activities human beings conduct.

Rise of China

China's rise is one of the most fundamental transformations observed over the past few decades and one that will continue to exert pressure on the international system for decades to come.⁴² China's economic, technological and military growth is unprecedented in the history of mankind. The country is the largest in the world in terms of population (1.5bn)

39 J. M. Epstein, *Measuring military power: the Soviet air threat to Europe*, Princeton University Press, Princeton, NJ, 1984.

40 Since 2019, NATO has started discussing the implications of China. Over the past few years, with the creation of the Innovation Board and more recently the launch of the Defense Innovation Accelerator for the North Atlantic (DIANA), NATO has similarly intensified its attention towards new technologies and innovation. Equally, climate security has emerged as a topic of primary interest for the Alliance in recent years.

41 *Op. cit.*, *Competitive strategy: techniques for analyzing industries and competitors*.

42 B. Jones, "China and the return of great power strategic competition", The Brookings Institution, Washington, DC, 2020; *Op. cit.*, "China's vision for a new world order"; *Op. cit.*, "An emerging China-centric order: China's vision for a new world order in practice"; *Op. cit.*, *The long game: China's grand strategy to displace American order*.

and the third largest in terms of geographic extension (or as large as the entire continent of Europe). Thanks to internal reforms and the benefits associated with globalization, China's GDP has also increased exponentially by about 3000 percent in the past 30 years. As a result, China's economy is now 20 percent larger than the US in terms of purchasing power parity (PPP) and in 2020 became the world's largest exporter (14.7 percent of global exports *vis-à-vis* 8 percent for the United States).⁴³ China's economic leap forward has also entailed a dramatic technological progress. China now hosts leading companies in several advanced fields, including Alibaba, Tencent, Huawei and ZTE. It also boasts universities that conduct cutting edge research in multiple fields, including Tsinghua, Beijing, Fudan and Zhejiang.⁴⁴ China's progress would not have been possible without technological innovation. Measuring innovation is difficult, but in terms of annual patent filings, China has stood as the global leader since 2011 and by 2019, 43 percent of all patent applications worldwide were made by Chinese organizations.⁴⁵

China's military power has followed an analogous path. China's defense budget has grown by a factor of between 10 and 25 over the past 30 years (depending on the data utilized).⁴⁶ China today possesses the largest navy in the world and its nuclear arsenal and doctrine are undergoing a significant shift in terms of quantity and quality of weapons and delivery systems. China is building nearly 250 missile silos in the country's northwest territory, signaling an unprecedented shift away from its traditional doctrine of minimum deterrence. More specifically, China is apparently quadrupling its current nuclear arsenal to some 1,000 warheads by 2030.⁴⁷ Beyond the maritime and nuclear realms, China's armed forces have also significantly expanded their capabilities in multiple domains, including space, cyber, and the electromagnetic spectrum.⁴⁸

The rise of China is driving the formation of an emerging bipolar configuration of the international system; it also signals a global transition of power away from the Euro-Atlantic area to the Indo-Pacific, thus representing a major break with the past 500 years of

43 World Bank, "GDP, PPP (current international \$) - China, United States", World Bank national accounts data and OECD national accounts data files; A. Nicita and C. Razo, *China: the rise of a trade titan*, UNCTAD, 27 April 2021.

44 *Op. cit.*, "An emerging China-centric order: China's vision for a new world order in practice"; *Op. cit.*, *The long game: China's grand strategy to displace American order*.

45 World Intellectual Property Organization, *World intellectual property indicators 2020*, WIPO 2020.

46 D. Lopes da Silva *et al.*, "Trends in world military expenditure, 2020", SIPRI, Stockholm, 2021; "China defense budget rises 7.1%, fastest pace in three years", *Bloomberg News*, 5 March 2022.

47 H. Cooper, "China could have 1,000 nuclear warheads by 2030, Pentagon Says", *The New York Times*, 3 November 2021; M. Korda and H. Kristensen, "China is building a second nuclear missile silo field", *Federation of American Scientists*, 26 July 2021.

48 Stockholm International Peace Research Institute, *SIPRI yearbook 2020: armament, disarmament and international security*, Oxford University Press, Oxford, 2020; *Op. cit.*, *Military and security developments involving the People's Republic of China 2021: annual report to Congress*, p.vii.

history. Most prominently, not only China can use substantial financial resources to support its foreign policy but is also capable to develop advanced technologies and capabilities which are a prerogative of only a handful of countries. In contrast to the Soviet Union, China's economy is also fully integrated into world's economy. To that end, NATO Allies and likeminded partners cannot gain greater advantages from international markets at China's expense. Lastly, China is an autocratic state, built around a rigid party structure and centralized management of the economy. This centralization and rigidity represent a potential vulnerability as, in case of a major political or economic crisis, it is not clear how the system would endure or respond, politically and economically.⁴⁹

Technological acceleration

Since the end of the 18th century, the world has observed an accelerating rate of technological innovation, representing a total rupture with eras prior to industrialization. To put it simply, life during the French Revolution was not particularly different from life in Ancient Rome: life expectancy was largely identical (20-33 vs. 29), the speed of warships remained similar (from 7 to 11 knots, or an increase by 0.002 knot per year), and land transportations still relied on human or animal energy.⁵⁰ With the First Industrial Revolution, the pace of technological change grew rapidly and to unprecedented levels.⁵¹ Remarkably, and in contrast to recurrent expectations about an end to economic growth, technological innovation has not only continued since then but in recent decades even accelerated.⁵²

The accelerating pace of technological innovation is evident in many realms but particularly in electronics. Consider that Intel's first integrated circuit, the 4004 produced in 1971, had 2,250 transistors; in 2022, Apple unveiled its M1 Ultra microchip, with 114 billion transistors. This is an increase by a factor of five billion, almost unachievable in any other realm or historical period.⁵³ As a result, digital computation is faster and more accurate. Calculations that previously required hundreds of years only a few decades ago

49 R. Gilpin, *War and change in world politics*, Cambridge University Press, Cambridge 1981; J. J. Mearsheimer, *The tragedy of great power politics*, W.W. Norton & Company Inc., New York, NY; *Op. cit.*, *The return of great power rivalry. Democracy versus autocracy from the ancient world to the US and China*.

50 F. M. Scherer and J. Mokyr, eds. *Twenty-five centuries of technological change: an historical survey*, Harwood Academic Publishers, New York, NY, 1990; T. Tardy (ed.), "COVID-19: NATO in the age of pandemics", *NDC Research Paper No.9*, NATO Defense College, Rome, May 2020.

51 D. S. Landes, *The unbound prometheus technological change and industrial development in Western Europe from 1750 to the present*, Cambridge University Press, Cambridge, 1969.

52 *Op. cit.*, *The second machine age: work, progress, and prosperity in a time of brilliant technologies*.

53 B. Thompson, "Apple's silicon event, scaling the M Series, ultraFusion and integration", *Stratechery*, 9 March 2022.

can now be performed in seconds. Similarly, a basic device the size of a USB stick now has more computing power than the Apollo XI mission computer module. All this was possible thanks to specific factors related to state-solid physics and economics. Adding transistors on silicon wafers did not entail higher marginal or operational costs. This led, in turn, to increasing efficiency, on the one hand, which combined to the exponential surge in demand, brought about falling costs in terms of performance, which further promoted innovation and efficiencies.⁵⁴ Over the past two decades, such technological transformation has led to the explosion of software and to the rise of Big Tech companies.⁵⁵ In the near future, technological acceleration is likely to favor other developments from Artificial Intelligence to human-enhancing technologies, materials to energy which in turn could revisit in the medium to long term the nature and intensity of several human activities.⁵⁶ Technological acceleration deserves attention as is reshaping industrial hierarchies, rewarding some geographic areas (like the Silicon Valley or the Chinese districts of Schenzen and Zhongguancun), some industries (like software and semiconductors), and some individuals. However, it is also leaving others behind.⁵⁷ Self-evidently, this discussion applies equally to interstate strategic competition. Countries that excel in technological innovation like Israel, the United States, China and South Korea – just to name a few – are gaining more from this transition than others. The case of the automotive industry is telling. After having been once a pillar of industrial might, automakers could soon lose relevance in the supply-chain due to the growing importance of software, thereby finding themselves relegated to the status of original equipment manufacturers (OEM) with smaller margins and market power.⁵⁸

Technological acceleration further affects the speed and intensity of strategic competition. A world characterized by accelerating returns leaves no room for competition, as no actor can catch up with innovators.⁵⁹ This also partially stems from the fact that rapid and massive changes call for adaptation in terms of organizational structure, culture, workforce as well as suppliers and complementors.⁶⁰ Importantly, technological acceleration remains uneven.

54 M. Tegmark, *Life 3.0: being human in the age of artificial intelligence*, Penguin, New York, NY, 2018; *Op. cit.*, *The second machine age: work, progress, and prosperity in a time of brilliant technologies*

55 C. Shapiro and H. R. Varian, *Information rules: a strategic guide to the network economy*, Harvard Business School Press, Cambridge, MA, 1999.

56 H. Kissinger *et al.*, *The age of AI: and our human future*, John Murray Publishers Ltd., London, 2021.

57 A. Azhar, *The exponential age: how accelerating technology is transforming business, politics and society*, Diversion Books, New York, NY, 2021; *Op. cit.*, *The second machine age: work, progress, and prosperity in a time of brilliant technologies*; *Op. cit.*, “Technological change and grand strategy”, in T. Balzacq and R. R. Krebs (eds.), *Oxford handbooks on grand strategy*.

58 T. Clarence-Smith, “How software will dominate the automotive industry”, Toptal.com.

59 *Op. cit.*, *The exponential age: how accelerating technology is transforming business, politics and society*.

60 A. Gilli and M. Gilli, “The diffusion of drone warfare? Industrial, organizational, and infrastructural constraints”, *Securi-*

In some areas, it is leading to additional industrial concentration, thus rewarding first movers, major companies or innovators. In others, it has a democratizing effect, spreading technologies and capabilities around the world.⁶¹ We see it in the commercial industry, whether cloud computing is dominated by Big Tech while small drones are produced by a plurality of companies. We can observe this phenomenon in military affairs too, where the increased accessibility of component technologies has democratized some capabilities, with long-range precision missiles or cyber weapons, now widely used by states like Iran and North Korea.⁶² Conversely, current and next generation jet fighters or submarines remain a prerogative of leading countries.⁶³

Like any technological transition, the current wave of technological change is generating previously unforeseen vulnerabilities. The combustion engine yielded higher horsepower but increased dependency on oil and other fuel sources; electrification of warships provided constant and stronger lights, communications, and long-range gunnery but also made entire onboard systems vulnerable to water. The same applies today – most prominently with digitalization. On the one hand, the open nature of the internet exposes all digital platforms to cyberattacks. On the other, our brains are not cognitively prepared to engage with adversarial disinformation which digital platforms are likely to spread.⁶⁴

Climate change

The third megatrend we consider is climate change. Climate change refers to the change in temperatures and other climatic conditions that have taken place in the past 200 years. Between 1850 and 1980, world temperatures rose by approximately 0.08°C per decade. However, since 1981 that increase has doubled to 0.18°C per decade.⁶⁵ Warmer temperatures are accelerating the melting of ice in the poles and in mountain chains, with sea levels consequently projected to rise by several feet in the 21st century. As average temperatures increase, extreme weather and cyclone activities have also grown more frequent: eight of the 10 most active years of extreme weather for the past seventy years have occurred since

ty Studies, Vol.25, Iss.1, pp.50-84, 2016; R. Adner, *The wide lens: a new strategy for innovation*, Penguin, London, 2012.

61 A. Gilli and M. Gilli, “Imitation, innovation, disruption: challenges to NATO’s superiority in military technology”, *NDC Policy Brief* No.25, NATO Defense College, Rome, 2019.

62 C. Kopp, “Evolving technological strategy in advanced air defense systems”, *Joint Force Quarterly*, No.57, Spring 2010, pp.86-93.

63 *Op. cit.*, “Imitation, innovation, disruption: challenges to NATO’s superiority in military technology”.

64 M. Smeets, *No shortcuts: why states struggle to develop a military cyber-force*, Oxford, UK, Hurst Publishing, forthcoming; “Cyber capabilities and national power: a net assessment”, International Institute for Strategic Studies, London, 2021.

65 “Global climate report - Annual 2020”, National Oceanic and Atmospheric Administration, US Department of Commerce, Washington, DC, 2020.

the mid-1990s.⁶⁶ Moreover, climate change will affect different areas in different ways. We can expect increasing flooding and permanent inundations of areas currently inhabited by hundreds of millions of people; however, we could also foresee more favorable conditions for agriculture and other economic activities in other parts of the world due to increasing precipitation and temperature.⁶⁷

Climate change is transforming the very relationship between human beings and their surrounding natural environment, raising major questions about the durability of the social, economic, political and technological progress that humankind has achieved.⁶⁸ Thus, climate change ultimately refers to the depletion of natural resources and to the unsustainability of our human footprint on Earth: as the global population grows and societies become increasingly wealthy, consumption and pollution will inevitably increase. Growth in the world population in the past decades led to an increased demand for energy, along with an accelerating depletion of natural resources and raw materials, reflected in higher prices.⁶⁹ This has a wide array of non-linear consequences. Higher energy prices make alternative energy sources relatively more convenient. However, some alternative energies, like renewables, require materials such as nickel or lithium, which are in scarce supply, expensive to extract, and toxic for the environment.⁷⁰

Climate change will also likely significantly impact Allied security. A changing climate will affect many communities and societies globally, causing displacement and deprivation of basic resources. More broadly, climate change is going to redistribute wealth and power, imposing heavy costs on some while benefiting others – either directly, through greater rainfall in previously arid areas and through warming temperatures for colder regions, or indirectly, by rewarding countries with access to renewable energies. Climate change also affects military power. Infrastructures and facilities may be damaged or even rendered non-accessible due to changing environmental conditions while military platforms' performance and maintenance cycles may be affected by different climatic dynamics. Last but not least, climate change may lead to internal or intra-state conflicts. Uprisings may result from lack of natural resources, migration from changing temperatures could destabilize many

66 “North Atlantic tropical cyclone activity according to the accumulated cyclone energy index, 1950-2020”, United States Environmental Protection Agency, Washington, DC.

67 “Report: flooded future: global vulnerability to sea level rise worse than previously understood”, Climate Central, 29 October 2019.

68 J. W. Busby, *States and nature: the effects of climate change on security*, Cambridge University Press, Cambridge, 2022.

69 *Op. cit.*, “Global climate report – Annual 2020”.

70 N. Tsafos, “Must the energy transition be slow? Not necessarily”, *CSIS Briefs*, CSIS, September 2018; L. Franza, *The geopolitics of energy security in Europe, between legacy and transformation*, Clingendael, The Hague, 2018; V. Bartuška *et al.*, *The geopolitics of energy security in Europe*, Carnegie Europe, Brussels, 2019; S. Tagliapietra, *L'energia del mondo. Geopolitica, sostenibilità, green new deal*, Il Mulino, Bologna, 2020.

countries, and mitigation measures against climate change could penalize some nations – just to name a few possibilities.⁷¹

Recent external shocks

These three forces will likely affect strategic competition in the foreseeable future. However, in the nearest term, strategic competition will also be shaped by two by exogenous shocks: the Covid-19 pandemic and the Russian invasion of Ukraine.

Covid-19 pandemic

With 500 million confirmed cases of infection and over 6 million deaths, the Covid-19 pandemic represents one of the most disrupting events the world has endured since 1945.⁷² Highly transmissible and deadly, Covid-19 led to the near collapse of national healthcare systems around the world, prompting governments worldwide to institute lockdowns that paralyzed social and economic activity. Alongside its immediate effects, the pandemic also brought with it wide-ranging consequences and implications. First, it has underlined the weaknesses of our societies and economic systems to health shocks, thus raising the strategic importance of public health and resilience measures. Second, the Covid-19 pandemic has deepened the process of digitalization in both professional and personal life, further accelerating the pace of technological change. Third, the pandemic has distributional consequences within and without nations: it has more severely impacted physical activities while rewarding so-called “knowledge work”, thereby imposing higher costs on some regions and countries in comparison to others. Finally, it has created enormous economic dislocation, generated massive budget deficits, and, in turn, enormous national debts that will have to be repaid at some point. Two years after the start of the Covid-19 pandemic, multiple coping and mitigation mechanisms – including social distancing, mass swab tests, and vaccines – seem to have returned a degree of normalcy for citizens at the personal, societal, and economic level. However, clusters of contagions still exist and emerge without warning, as was witnessed in China in Spring 2022. Whether new variants will emerge and spread globally, whether some areas or countries will be overwhelmed, and whether the age

71 *Op. cit.*, *States and nature: the effects of climate change on security*; J. W. Busby, “Beyond internal conflict: the emergent practice of climate security”, *Journal of Peace Research*, Vol.58, No.1, 2021, pp.186-194.

72 “The world surpasses half a billion known coronavirus cases, amid concerns about testing”, *The New York Times*, 13 April 2022.

of the pandemic is nearing its end is difficult to say. Realistically, though, we can foresee two scenarios:⁷³ first, the pandemic is over and the mechanisms we have developed so far will either prevent a new variant to emerge or enable states to effectively cope with its effects; second, a new deadly and spreading variant of Covid-19, or even a new virus, will emerge, forcing new waves of lockdowns and hospitalizations, and in turn economic depression.

Irrespective of these two scenarios, in the years ahead we will likely observe further attention to health security, supply-chain resilience, cyber security and disinformation.⁷⁴

The war in Ukraine

The February 2022 Russian invasion of Ukraine represents another major shock to international politics. At the time of writing, the outcome of the war remained undetermined due in part to its transformation into an attrition campaign. Regardless of the duration and outcome of the war, though, some of its effects are already visible in multiple domains.⁷⁵ These effects will likely endure into the near future. The economic disruption caused by the war will negatively impact macroeconomic growth due to a mixture of lost exports, scarcity of inputs (like raw materials and commodities) and inflationary pressures caused by the rise of energy and food prices.⁷⁶ Whether this is the end of globalization, it is too early to say. The next decade, though, will likely be characterized by lower economic growth and innovation.⁷⁷ A dearth of materials like silicon, nickel, zinc, aluminum, and steel may not only impact industrial production, but also technological innovation and the energy transition.⁷⁸ Additionally, countries will invest further to increase the resilience of their supply-chains. To that end, redundancy will likely trump efficiency, with cascading effects on macroeconomic growth. In some cases, a lack of food supplies and fertilizers could even generate social uprisings, political revolts, migrations and humanitarian crises. Finally, energy security considerations will surely reduce (Western) countries' reliance on

73 H. Ledford, "The next variant: three key questions about what's after Omicron", *Nature*, Vol.603, 2022, pp.212-213; N. Loder, "What to expect in year three of the pandemic", *The Economist*, 8 November 2021.

74 *Op. cit.*, "COVID-19: NATO in the age of pandemics"; H. Brands and F. J. Gavin, *COVID-19 and world order: the future of conflict, competition, and cooperation*, The Johns Hopkins University Press, Baltimore, MD, 2020; C. Kahl and T. Wright, *After-shocks: pandemic politics and the end of the old international*, McMillan, New York, NY, 2021.

75 T. Tardy (ed.), "War in Europe: preliminary lessons", *NDC Research Paper* No.23, NATO Defense College, Rome, May 2022.

76 R. Pomeroy, "How the Ukraine war is driving up food and energy prices for the world", World Food Programme, 25 March 2022; A. S. Posen, "The end of globalization?", *Foreign Affairs*, 17 March 2022.

77 B. V. Roye and T. Orlik, "Global economic growth set for 3.2% pace in next decade", *Bloomberg News*, 30 December 2021.

78 A. Mohseni-Cheraghloou, "Beyond oil, natural gas, and wheat: the commodity shock of Russia-Ukraine crisis", Atlantic Council, Washington, DC, 9 March 2022.

Russian oil and gas. Incentives to accelerate the energy transition will grow, but bottlenecks in the supply-chain and in material markets will likely constrain this option. Realistically, less environmentally friendly energy sources will be relied upon, thus accelerating climate change.⁷⁹

Beyond its immediate impact, the war in Ukraine exemplifies the return of Great Power competition and the relevance of collective defense for NATO.⁸⁰ In the medium-to-long term, three scenarios are possible.

In a first scenario, by the end of 2022, Ukraine and Russia will sign a peace treaty. Russia will have lost a significant part of its combat power. Its economy will have suffered enormous dislocation. International sanctions will not be lifted, thus further constraining Russia's economy and its military modernization. However, Europe's dependency on Russian oil and gas will continue. Over the long-term, Russia will be a weaker actor, but potentially more aggressive. Resembling Iran, Russia could likely employ a wide variety of instruments to destabilize Euro-Atlantic security, including cyber operations, proxy fighters, conventional threats, and terrorist attacks.

In a second scenario, the war in Ukraine will reach a settlement only in the medium term – for instance, between 2025 and 2028. Russia's economy will suffer massively, both because of ongoing sanctions and NATO Europe's efforts to diversify its energy imports. Russia will hence lose a significant portion of its industrial and manufacturing capabilities while its oil and gas exports will also be affected due to lack of access to foreign technology and services. Russia will hence come to resemble to North Korea, a deeply isolated, totalitarian political system ruled by an elite primarily interested in maintaining domestic political power and personal wealth. Like North Korea, Russia could then resort to nuclear weapons to extort concessions – albeit with a far larger nuclear arsenal.⁸¹

A third scenario, impossible to predict at this stage, is that the regime in power in Moscow will collapse, either through a *coup d'état*, a domestic uprising, or the dissolution of the Russian federation due to local uprisings.

79 A. S. Corbeau, "How deep is Europe's dependence on Russian oil?", State of the planet, Columbia Climate School, 14 March 2022.

80 S. Kotkin, "The Cold War never ended – Ukraine, the China challenge, and the revival of the West", *Foreign Affairs*, May/June 2022.

81 D. Byman and J. Lind, "Pyongyang's survival strategy: tools of authoritarian control in North Korea", *International Security*, Vol.35, No.1, 2010, pp.44-74.

Methodology and assumptions

How are the transformations occurring in international politics affecting NATO, its Allies' security, and its current activities? In this report, we explore these questions by relying eclectically on the concept of competitive strategy. We identify three different forces – the rise of China, technological acceleration and climate change – which we believe capture some of the major transformations at play and we analyze their impact on NATO's current core tasks. We also consider the intervening role of the Covid-19 pandemic and the war in Ukraine.⁸² In this section, we briefly describe our methodology and our assumptions.

Our analysis builds on around 10 meetings the participants of this report held online from July to February 2021. During these meetings, the structure of our analysis was developed, including the focus on NATO's core tasks and the trends and shocks that will impact the Alliance. The participants internally generated a set of questions regarding the rise of China, technological acceleration and climate change and these trends' impact on NATO's core tasks. Answers were generated through a set of meetings and further refined during a December 2021 in-person workshop held at the NATO Defense College. Multiple online meetings occurred to fine-tune and clarify some of the answers and their implications between late Winter and early Spring 2022.

To conduct our analysis, we considered two scenarios, each based on a specific assumption. Our baseline scenario holds that the three forces considered in this report – the rise of China, technological acceleration and climate change – will proceed unaffected in the years ahead. In other terms, we assume that both the Covid-19 pandemic and the war in Ukraine will have relatively limited medium-to-long term effects. This decision stems from our desire to prioritize long-term trends over more recent developments.

In contrast, our disruption scenario assumes that the Covid-19 pandemic and the war in Ukraine will exert significantly stronger effects on the three trends and on NATO's core tasks themselves. In particular, China's rise may slow significantly, technological acceleration may similarly flatten, and climate change will likely worsen due to higher consumption of less environmentally friendly energy sources and unavailability of materials needed for a green transition.

⁸² *Op. cit.*, *War transformed the future of twenty-first-century great power competition and conflict*; *Op. cit.*, *The return of great power rivalry democracy versus autoocracy from the ancient world to the US and China*.

Trends, shocks and collective defence

In this chapter we focus on the first and main core task of NATO, collective defense. In accordance with Article 5 of the Washington Treaty, collective defense sets the basis for mutual assistance among Allies and entails deterring and defending against any foreign threat or emerging security challenge that any individual Ally, or the Alliance as a whole, faces.⁸³ We consider the effects produced by the rise of China, technological acceleration and climate change and second by the two more recent shocks of Covid-19 and the war in Ukraine, on collective defence.

The rise of China and collective defence

China has risen economically, technologically, and militarily for the past four decades; however, NATO Allies only formally recognized the strategic implications of China's rise for the Alliance in particular in 2019, with the London Declaration.⁸⁴ Then as now, some questioned whether NATO should include China within the Alliance's portfolio, as it is geographically distant from the North Atlantic region – the primary area of responsibility (AOR) for NATO. We do not adjudicate on this debate; instead, we simply highlight that a rising China will directly affect NATO and its core task of collective defense in at least three ways.⁸⁵

First, China's ongoing military modernization will demand ever-greater American attention and resources. This will stretch US capabilities thin in Europe, particularly its nuclear deterrent.⁸⁶ Intelligence reports suggest that the People's Liberation Army will field

83 P. E. Gallis, "NATO: article V and collective defense", *CRS Report for Congress*, Congressional Research Service, Washington, DC, 1997.

84 NATO, *London Declaration*, NATO Press Release, Brussels, December 2019.

85 F. Heisbourg, "NATO 4.0: the Atlantic Alliance and the rise of China", *Survival*, Vol.62, No.2, 2020, pp.83-102.

86 *Op. cit.*, "China and the return of great power strategic competition"; *Op. cit.*, "China's vision for a new world order".

one thousand nuclear warheads by 2030.⁸⁷ The US nuclear deterrence posture and strategy are not designed to simultaneously face two peer strategic nuclear adversaries.⁸⁸ Since NATO is a nuclear alliance and its nuclear deterrence posture depends on the capabilities of its Allies, primarily the US, for its strategic nuclear forces, the growth of China's nuclear arsenal thus necessarily and negatively affects NATO's deterrence.⁸⁹

Second, China's military expansion may likely require some NATO Allies to contribute more significantly to Indo-Pacific security.⁹⁰ Parallel to the United States' decade-long retrenchment, the European transatlantic three – France, Germany, and the UK – have each signaled greater ambitions in the region.⁹¹ These ambitions could, however, compromise European security in general and NATO's conventional defense posture in particular. An uncoordinated pivoting to East Asia risks leaving Europe vulnerable to more immediate threats.⁹² Additionally, Europe and East Asia represent two very different theaters: Europe is primarily a land theater, with significant strategic depth surrounded by seas; conversely, Asia – and especially its Eastern shores – is coastal, peninsular and insular, where states are characterized by high population density, little strategic depth, and significant dependence on seaborne trade.⁹³ From a collective defense perspective, Europe calls for specific capabilities where land forces play a dominant – although not exclusive – role; Asian security, by contrast, requires long-range logistical assets and a force structure more based on sea and air power overall. In practice, pivoting military capabilities towards Asia could change the economics of European defense, as the different investments, technologies, and training required for an Asia-centric posture reduces the room for scope and scale

87 *Op. cit.*, *Military and security developments involving the People's Republic of China – A report to Congress pursuant to the National Defense authorization act for fiscal year 2000*.

88 F. S. Cunningham and M. T. Fravel, "Assuring assured retaliation: China's nuclear posture and US-China strategic stability", *International Security*, 2015, Vol.40, Iss.2, pp.7-50; H. M. Kristensen and M. Korda, "Chinese nuclear forces, 2020", *Bulletin of the Atomic Scientists*, Vol.76, No.6, Vol.2020, pp.443-457; J. M. Smith and P. J. Bolt (eds.) *China's strategic arsenal: worldview, doctrine, and systems*, Georgetown University Press, Washington, DC, 2021.

89 A. Krepinevich, "The new nuclear age. How China's growing nuclear arsenal threatens deterrence", *Foreign Affairs*, May/June 2022; E. A. Colby, *The strategy of denial: American defense in an age of great power conflict*, Yale University Press, New Haven, CT, 2021.

90 L. Simón, "Europe, the rise of Asia and the future of the transatlantic relationship", *International Affairs*, Vol.91, No.5, 2015, pp.269-289.

91 H. Meijer, *Awakening to China's rise. European foreign and security policies toward the People's Republic of China*, Oxford University Press, Oxford, forthcoming 2022.

92 N. Silove, "The pivot before the pivot: US strategy to preserve the power balance in Asia", *International Security* Vol.40, No.4, 2018, pp.45-88; H. Meijer and S. G. Brooks, "Illusions of autonomy: why Europe cannot provide for its Security if the United States pulls back", *International Security*, Vol.45, No.4, 2021, pp.7-43. See also T. Kim and L. Simón, "A reputation versus prioritization trade-off: unpacking allied perceptions of US extended deterrence in distant regions", *Security Studies*, Vol.30, No.5, pp.725-760, 2021.

93 For a discussion of these issues, see R. S. Ross, "The geography of the peace: East Asia in the twenty-first century", *International Security*, Vol.23, No.4, Spring, 1999, pp.81-118.

economies and, consequently, the effectiveness of European defense spending.

Third, China's technological growth has lowered the costs of many electronic devices, in turn enabling the current global digital transformation.⁹⁴ However, reliance on Chinese equipment also generates a security-of-supply risk and potentially introduces various cyber security vulnerabilities – especially when used for defense applications.⁹⁵ Similarly, China's technological rise in emerging domains like artificial intelligence, cloud computing, and 5G communication raises broader intra-Alliance questions about the reliability of software/hardware integration, data security, encryption, and intelligence sharing, each of which will take on a greater role in the future.⁹⁶ In the era of globalization, China's technological growth represented a deflationary mechanism. In the age of Great Power competition, China's technological growth represents a potential threat to collective defense.

Technological acceleration and collective defence

Technological acceleration could also significantly impact NATO's capacity to ensure collective defense. First and foremost, a rapid rate of technological change pushes military capabilities towards obsolescence more quickly. This reality requires ongoing and ever-greater investments in innovation as well as training, recruitment, and supporting infrastructure to harness new technologies.⁹⁷ When rapid technological change occurs, moreover, armed forces have historically responded by devising new doctrines and operational concepts while mastering new tactics and techniques.⁹⁸ This in turn requires militaries to carry out more exercises and experimentation.⁹⁹ It is too early to say whether AI, 5G communications,

94 J. Woetzel *et al.*, "China's role in the next phase of globalization", McKinsey Global Institute, San Francisco, CA, 2017.

95 J. S. Gansler, *Democracy's arsenal, creating a twenty-first century defense industry*, MIT Press, Cambridge, MA, 2011.

96 *Op. cit.*, "NATO and 5G: what strategic lessons?", *NDC Policy Brief* No.13, NATO Defense College, Rome, 2020; M. Rassner A. Riikonen, "Open future, the way forward on 5G", *CNAS Reports*, Washington, DC, 2020; T. Maurer and G. Hinck, "Cloud security: a primer for policymakers", *Paper*, Carnegie Endowment for International Peace, Washington, DC, 2020.

97 A. Gilli, "The Diffusion of drone warfare? Industrial, organizational, and infrastructural constraints"; A. Gilli and M. Gilli, "Why China has not caught up yet: military-technological superiority and the limits of imitation, reverse engineering, and cyber espionage", *International Security*, Vol.43, No.3, Winter 2018/19, pp.141-189; A. Asoni *et al.*, "A mercenary army of the poor? Technological change and the demographic composition of the post-9/11 US military", *Journal of Strategic Studies* (forthcoming); A. Goldfarb and J. R. Lindsay, "Prediction and judgment: why artificial intelligence increases the importance of humans in war", *International Security*, Vol.46, No.3, Winter 2021/22, pp.7-50. E. Kania, "Artificial intelligence in China's revolution in military affairs", *Journal of Strategic Studies*, Vol.44, No.4, 2021, pp.515-542.

98 S. Biddle, *Nonstate warfare: the military methods of guerillas, warlords, and militias*, Princeton University Press, Princeton, NJ, 2021; A. Calcara *et al.*, "Why drones have not revolutionized war – The enduring hide-and-seek competition in air warfare", *International Security*, Vol.46, No.4, Spring 2022, pp.130-171.

99 M. C. Horowitz, *The diffusion of military power: causes and consequences for international politics*, Princeton University Press,

robotics, quantum computing and other emerging and disruptive technologies will truly transform the battlefield. It is a fact, however, that the more investments and political capital allocated in preparing for a future war, the more one runs the risk of neglecting the last or a current war.¹⁰⁰

A second major challenge looms on the horizon for NATO as emerging and disruptive technologies mature. With further developments of EDTs entering into existing force structures, member states within the Alliance could see a capability gap emerge between their respective militaries. Further, commercial rivalries could arise and render it more difficult to find a political solution towards technological information sharing and diffusion.¹⁰¹ As a result, NATO could observe a simultaneous weakening of its joint combat effectiveness and its internal unity.¹⁰²

Third, technological acceleration will generate altogether new threats and vulnerabilities. Digitalization increases the risk of cyber-attacks and cloud computing adds additional layers of risks: more generally, any technological transition entails changes in the supply-chain and thus raises broader security-of-supply dilemmas related to the defense-technological industrial base. Each could dramatically impact a state's capacity to wage war.¹⁰³ Similarly, new technologies, especially digital platforms, open new ways to spread disinformation and execute so-called "information warfare". These threats could undermine NATO solidarity from within – to which growing socio-economic inequality favored by technological change could also contribute.¹⁰⁴ Last but not least, new capabilities enabled by emerging technologies are shrinking geographical distances.¹⁰⁵ Hypersonic vehicles and cyber weapons are a case in point. From a collective defense perspective, this bears significant importance as the Alliance could see an expansion of the geographical areas from which threats emanate, all while its area of responsibility possibly remains more limited.¹⁰⁶

Princeton, NJ, 2010.

100 T. J. Sejnowski, *The deep learning revolution*, The MIT Press, Cambridge, MA, 2018; *Op. cit.*, "NATO and 5G: what strategic lessons?"; *Op. cit.*, "Technological change and grand strategy", pp.221-239.

101 D. Fiott, "A revolution too far? US Defence innovation, Europe and NATO's military-technological gap", *Journal of Strategic Studies*, 2017, Vol.40, Iss.3, pp.417-437.

102 A. Gilli, "NATO-mation": strategies for leading in the age of artificial intelligence", *NDC Research Paper No.15*, NATO Defense College, Rome, 2020.

103 J. Cirillo *et al.*, "The future of the digital order", Center for a New American Security, Washington, DC, 2021.

104 K. Cao *et al.*, "Countering cognitive warfare: awareness and resilience", *NATO Review*, May 2021; A. Lanoszka, "Russian hybrid warfare and extended deterrence in eastern Europe", *International Affairs*, Vol.92, 2016, pp.175-195.

105 "Science & technology trends 2020-2040, exploring the S&T edge", NATO Science & Technology Organization, Brussels, 2020.

106 D. Deudney, "Geopolitics as theory: historical security materialism", *European Journal of International Relations*, Vol.6 No.1, 2000, pp.77-107.

Climate change and collective defense

Historically, security scholars and practitioners have fallen into two camps: those who focus on traditional security issues like defense policy or military operations and those focusing on non-traditional issues like food security, human security and climate security.¹⁰⁷ This disciplinary and academic divide has incorrectly presented traditional military threats and climate change as opposed rather than intertwined.¹⁰⁸ Climate change is in fact both an existential threat to humanity and a significant threat to collective defense.¹⁰⁹ Thus, in the foreseeable future we should anticipate that executing collective defense missions will be more difficult for NATO militaries in three domains: military effectiveness and readiness, military power projection, and rivals' opportunities.

Consider climate change's impact on military readiness and effectiveness. Stronger currents, increased salinity, and higher variation in water temperatures, which all result from climate change, negatively impact military platforms, including their maintenance, their availability, and their lifecycle.¹¹⁰ As a result, climate change may more easily deplete NATO's defense capabilities. Similarly, melting Arctic ice, rapid changes in rain seasonality and other climate-induced phenomena impact the availability and security of military facilities and other military infrastructures, including logistical connections.¹¹¹ Along the same lines, climate change also impacts sonar and radar systems and consequently the effectiveness of NATO's military platforms.¹¹²

The second set of challenges posed by climate change regards states' ability to generate and project military power in the future. Change in water temperatures and salinity, precipitations and humidity, and higher seasonal thermal excursions will, indeed, impact military operations, training, and exercises.¹¹³ Rising temperatures, moreover, may provoke the subsequent degradation of the permafrost in the Arctic regions, endangering geocryological side-effects. The territorial deformation that results, for instance, could

107 J. W. Busby, "Who cares about the weather? Climate change and US national security", *Security Studies*, Vol.17, Iss.3, No.3, September 2008, pp.468-504.

108 *Op. cit.*, "Climate change and US military power: hunting for red october in the warming North Atlantic".

109 *Op. cit.*, "Who cares about the weather? Climate change and US National Security", pp.468-504.

110 A. Bloch and J. Goldgeier, "Finding the right role for NATO in addressing China and climate change", Brookings, Washington, DC, October 2021.

111 B. Barry *et al.*, "Green defense: the defense and military implications of climate change for Europe", International Institute for Strategic Studies, London, February 2022.

112 *Op. cit.*, "Climate change and American primacy".

113 J. Dobbs, "Climate change and NATO nuclear deterrence", Non-Paper prepared by the NATO Nuclear Policy Directorate (NPD), NATO HQ, 4 May 2021, Version 2.0.

have repercussions for roads, rail lines, and other critical infrastructure and logistical networks. Disruptions cause by the melting of the permafrost may impact Russia's energy infrastructure, including its oil and gas pipelines, extraction facilities, and nuclear stations, which are built in the most at-risk areas, but NATO Allies may also be affected.¹¹⁴

Thirdly, climate change could represent an opportunity for NATO's rivals. The melting of the Arctic is already creating faster and cheaper shipping routes from China to Europe, thus intensifying the region's strategic importance and potentially increasing its militarization.¹¹⁵ Additionally, intensifying climatic differences could potentially call for regional specializations within NATO, with each country's armed forces developing military capabilities for particular climatic areas. Regional specialization is, however, a solution so far avoided as it is at odds with the principle of solidarity characterizing NATO.¹¹⁶

External shocks: Covid-19 and the war in Ukraine

The Covid-19 pandemic and the war in Ukraine represent two major, near-simultaneous shocks that could further complicate collective defense. We acknowledge these are different types of shocks – the former purely naturogenic, while the latter primarily conventional and kinetic. The pandemic has primarily made all Allies look inward in their public health management, while Russia's invasion of Ukraine has united them in a way not seen at least since 9/11. Yet, there remain a set of commonalities in the way these two disparate events have impacted Allies and will likely do so into the foreseeable future.

A first set of implications regard their economic, macroeconomic, and financial consequences. Indeed, although many NATO Allies have indicated their interest in or commitment to increase defense expenditures, the pandemic and the war in Ukraine are exerting major negative macroeconomic pressures on national finances that will most likely increase further.¹¹⁷ On the one hand, fiscal deficits will likely be reduced in the near term as national debts accumulated during the pandemic must be repaid. On the other hand, however, the war in Ukraine could bring slower long-term growth, higher inflation and,

114 M. Polovtseva, "A blessing and a curse: melting permafrost in the Russian Arctic", The Arctic Institute, 3 November 2020; K. Kertysova and A. Ramnath, "How permafrost thaw puts the Russian Arctic at risk", *The Global Observatory*, 22 November 2021.

115 I. Anthony *et al.*, "A strategic triangle in the Arctic? Implications of China-Russia-United States: power dynamics for regional security", *SIPRI Insights on Peace and Security*, No.2021/3, March 2021.

116 B. Giegerich, "NATO's smart defence: who's buying? Bastian Giegerich", *Survival*, Vol.54, No.3, 2012, pp.69-77.

117 C. Mackenzie, "Seven European nations have increased defense budgets in one month. Who will be next?", *Breaking Defense*, 22 March 2022.

thus, greater interest rates, which when combined will place growing defense expenditure in tension with balanced budgets. Self-evidently, new Covid-19 variants or the emergence of a new pandemic could add further strains.¹¹⁸

Second, the Covid-19 pandemic accelerated the adoption of digital technologies to enable remote working. However, the supply-chain bottlenecks resulting from this spike in demand spurred a commodity super-cycle, with the price of energy, materials, and commodities all experiencing a dramatic surge.¹¹⁹ One direct consequence has been the shortage of several component technologies like semiconductors and materials like steel and aluminum. The war in Ukraine has further exacerbated this situation.¹²⁰ Carmakers are currently prioritizing luxury vehicles over city cars for the allocation of semiconductors.¹²¹ Defense companies could face similar challenges. Over the medium term, another consequence could be a slower pace of technological innovation. For example, companies will need to strengthen global supply-chains, diverting scarce resources away from research and towards redundancy investments, while inflation will hurt aggregate demand and an increase in interest rates will reduce the availability of capital investments for new technologies and innovations, affecting defense economics.¹²²

Climate change will likely worsen over the next few years, as less environmental-friendly energy sources will be used to compensate for the unavailability or cuts of Russian oil and gas.¹²³ At the same time, increase in prices of several raw materials may compromise the energy transition.¹²⁴ Events in Ukraine and the Finland and Sweden accession to NATO will likely see the strengthening and enlarging of the Alliance's deterrence and defense posture, especially in the Baltic region, over the next few years. This would mean, among other consequences, that defense investments will unlikely prioritize climate security – especially if this entails greater resource commitments and longer capability development times. This will prod a new assessment of Allies' defense capabilities. Similarly, the possible slowdown of technological acceleration along with the early lessons of the war in Ukraine may in fact convince NATO Allies to focus less on developing new weapons systems and more on investing in current capabilities. The conflict has so far shown that Ukrainian

118 *Op. cit.*, “Global economic growth set for 3.2% pace in next decade”.

119 H. Ziady, “The perfect storm making everything you need more expensive”, CNN, 9 June 2021.

120 A. Mohseni-Cheraghlou, “Beyond oil, natural gas, and wheat: the commodity shock of Russia-Ukraine crisis”, Atlantic Council, Washington, DC, 9 March 2022; J. Bezat, “Le secteur français de la défense réclame d'avantage de visibilité”, *Le Monde*, 19 May 2022.

121 J. Miller, “Ukraine war spurs decline of the affordable car”, *The Financial Times*, 17 March 2022.

122 “The \$773 billion question: inflation's impact on defense spending”, McKinsey & Co, 28 March 2022; F. McGerty, “Global defence spending – the impact of inflation”, Military Balance Blog, 15 February 2022.

123 Intergovernmental Panel on Climate Change, *Climate Change 2022: mitigation of climate change*, April 2022.

124 D. Gabaldon *et al.*, “War in Ukraine: lessons for managing the energy transition”, Roland Berger, 11 March 2022.

forces could defend against Russia because of their mastery of traditional combined arms warfare, not because of artificial intelligence, quantum computing or 5G.¹²⁵ However, this could also prove detrimental to defense innovation and the development of future military capabilities.

Finally, in case of a prolonged war of attrition between Ukraine and Russia, sanctions against Russia will likely remain in place. Under such circumstances, Russia's military power would progressively deplete. From a collective defense perspective, this has two major implications. On the one hand, Russia could grow more similar to Iran or even North Korea, where a kleptocratic elite issues external threats to preserve its internal power while extorting concessions from abroad – albeit with the world's largest nuclear arsenal. In this case, Integrated Ballistic Missile Defense could possibly reemerge as a major priority for NATO.¹²⁶ On the other hand, relations between Russia and China have attracted enormous speculation since the beginning of the war. In case they were to strengthen their ties (in a purely speculative and at this stage abstract scenario), China could decide to provide economic and even military support to Moscow: this would grant China access to Russia's military technology and natural resources while maintaining a constant threat to the Euro-Atlantic community, thereby partially hindering some NATO Allies' would-be pivot towards Asia. In this respect, one consideration deserves attention. At the time of writing, China is undergoing significant difficulties with the management of the latest variant of the Covid-19 pandemic. We cannot rule out that a more rigid and centralized Chinese system will struggle further in the months and years ahead, thus slowing down China's economic, technological, and military growth. Coupled with potential structural weaknesses in the Chinese economy, this scenario could in theory offer Beijing's stronger incentives to adopt a more assertive foreign policy, in part to cover its domestic challenges.¹²⁷

125 D. M. Herszenhorn and P. McLeary, "Ukraine's 'iron general' is a hero, but he's no star", *Politico*, 8 April 2022; P. de Dreuzuy and A. Gilli, "Russia's military performance in Ukraine", *Op. Cit.*, "War in Europe: preliminary lessons", pp.25-41.

126 A. Marrone and K. Muti (eds.), "Europe's missile defence and Italy: capabilities and cooperation", *Documenti LAI*, No.21, Istituto Affari Internazionali, Rome, 2021.

127 H. Brands, "The dangers of China's decline. As China's economic miracle fades, its leaders may become more inclined to take risks", *Foreign Policy*, 14 April 2022; D. H. Rosen, "The age of slow growth in China. And what it means for America and the global Economy", *Foreign Affairs*, 15 April 2022.

Trends, shocks and crisis management

NATO's second core task is crisis management. It was added as part of the 1991 Strategic Concept, both to institutionalize the activities that the Alliance had already undertaken in the previous years and to prepare for future challenges. Crisis management enables Allies to use all their available political and military tools to jointly address a full spectrum of crises. Its purpose is to prevent potential crises that could affect Allied security, contain or de-escalate existing crises before they deteriorate into full-scale conflicts, and end conflicts while consolidating stability in post-conflict situations.¹²⁸

NATO's crisis management responsibilities emerged at a time when NATO enjoyed both global military primacy and a low risk of major interstate war. With the return of Great Power competition and the diffusion of military power through globalization, the geopolitical setting in which crisis management emerged is now under question. It is one thing for NATO to conduct peacekeeping or counter-insurgency operations; it is another to prevent or manage proliferating conflicts of varying intensity and in multiple regions – including conventional wars between third parties and in wars where participants are endowed with nuclear weapons, as is the case with the Russian invasion of Ukraine. In this chapter, then, we ask: will the rise of China, technological acceleration, and climate change affect NATO's crisis management, and if so, in what ways?

The rise of China and crisis management

The rise of China could significantly affect NATO's crisis management by generating new types of crises for which NATO's crisis management instruments were not conceptualized to address. Moreover, China's rise could also increase the number and intensity of crises that NATO must contend with.

128 H. Gärtner, "European security, NATO and the transatlantic link: crisis management", *European Security*, Vol.7, No.3, 1998, pp.1-13.

First and foremost, China is already directly contributing to or fueling several crises in the international system today. The case of Taiwan is the most distinct and concerning. China's ongoing harassment, intimidation, and blackmail against Taiwan could soon produce one of the most important military crises since the end of the Cold War, due both to the island nation's geopolitical significance and its importance to the global economy as a leading semiconductor producer.¹²⁹ If China were to escalate its provocations against Taiwan, how should NATO respond? This is not a purely hypothetical question, as NATO Allies are already involved in Taiwan to varying degrees. Some have made political commitments to Taiwan's security. Others maintain territorial possessions in the area or are economically dependent on the flow of goods like advanced semiconductors.¹³⁰

The implications of a potential Taiwan crisis could go well beyond China and raise major questions about the nature and purpose of NATO's crisis management. One approach would be to consider crisis management a third-party intervention tool aimed at bringing peace and at halting humanitarian tragedies. Another would be to consider it an instrument for preserving international order in the age of Great Power competition and confrontation, including vis-à-vis nuclear countries. NATO faces a dilemma, between being irrelevant in front of a major international crisis or being pulled in the middle of a contest which does not directly threaten its Allies' security.

Second, China is a major exporter in the global arms trade, and its global sale of weapons could generate, exacerbate, or prolong crises around the world.¹³¹ In this case, the proliferation of Chinese arms globally could not only increase the number of crises like those that NATO faced during the 1990s, but also conventional military conflicts for which its crisis management tools are not primarily designed to handle. Moreover, China's sale of anti-access/area-denial capabilities to third parties could assist actors in either complicating or outright preventing NATO from intervening in crises using air power and other related capabilities.¹³²

China's arms sales could also be considered as part of the larger Belt and Road Initiative (BRI). With the BRI, China has launched a complex framework of infrastructure finance, technology transfer, and foreign market entry that ties it closely to countries around the

129 M. A. Hunzeker and A. Lanoszka, "A question of time: enhancing Taiwan's conventional deterrence posture", Center for Security Policy Studies, Arlington, VA, 2018, p.20.

130 B. Thompson, "Chips and geopolitics", *Stratechery*, 19 May 2020.

131 A. Marksteiner *et al.*, "The SIPRI top 100 arms-producing and military services companies, 2020", SIPRI, December 2021; P. Christopher *et al.*, "A guide to extreme competition with China", RAND Corporation, Santa Monica, CA, 2021; H. Brands, "China's foreign policy weapons: technology, coercion, corruption", *Bloomberg News*, 25 January 2021.

132 A. F. Krepinevich and B. Watts, "Meeting the anti-access and area-denial challenge", Center for Strategic and Budgetary Assessment, Washington, DC, 2003.

world. Skepticism regarding the objectives of the BRI remain widespread. In several cases, including most notably the case of Sri Lanka, debts incurred through the BRI have negatively affected the financial health of recipient countries and pushed their leadership into a spiral of interest repayment and subsequent political instability.¹³³ We cannot rule out that the BRI and related projects will accelerate in the years ahead, further contributing to crises and instability in critical regions around the world.

A rising China could also indirectly affect NATO's crisis management capabilities and effectiveness. China could increasingly contest the global commons, including air, sea, space, and cyberspace, thereby rendering NATO crisis management missions inherently more difficult.¹³⁴ As discussed in the first chapter, after the end of the Cold War, NATO could intervene in several theaters due its military primacy. The rise of China challenges this assumption, especially if Chinese arms and air defense systems begin to flood regions that are already crisis prone.

Technological acceleration and crisis management

Will technological acceleration impact NATO crisis management? Several considerations suggest that it will. As with the rise of China, new technologies may either facilitate the emergence of new crises or lead to an increase in the types of crises NATO will face, making crisis management overall more difficult for the Alliance.

First, new technologies could simultaneously provide excellent new tools to detect forthcoming crises, while also introducing instruments that enable actors to generate new crises. NATO may definitively benefit from the former, but its activities could be more negatively impacted by the latter. As the pandemic has shown, cyber-enabled disinformation campaigns are pervasive and effective. We cannot rule out that, as digital platforms extend their reach to ever more new users, disinformation and misinformation will exacerbate global instability. Progress in the production of so-called "deepfakes" will only worsen the situation, especially as further improvements in facial recognition software, including the spread of deepfake apps, will reduce the cost and difficulty of content creation for public

133 D. Kliman *et al.*, "Grading China's belt and road", Center for New American Security, Washington, DC, 2019; M. Green, "China's debt diplomacy: how belt and road threatens countries' ability to achieve self-reliance", *Foreign Policy*, April 2019.

134 "Contested global commons: a multidimensional issue for the Strategic Compass", *EUISS event report*, Paris, 12 March 2021; A. M. Denmark and J. Mulvenon (eds.), "Contested commons: the future of American power in a multipolar world", Center for New American Security, Washington, DC, 2010.

users.¹³⁵ Moreover, technological acceleration will also likely bring about ever-greater socio-economic inequality and by association social tensions and instability.¹³⁶

Second, technological acceleration could expand the spectrum of crises that NATO will face. Crisis management was initially designed to address ethnic and religious conflicts between weaker, resource-scarce actors. The responsibilities inherent in crisis management then expanded to include other areas, including counterinsurgency and humanitarian intervention.¹³⁷ Technological acceleration could, however, promote several other types of conflict, including conventional inter-state wars among capable actors such as Russia's 2022 war against Ukraine or Azerbaijan's war in 2020 against Armenia. The proliferation of highly accurate precision-guided munitions (already evident in the Middle East) similarly presents a new major source of instability.¹³⁸ Lastly, some countries could more simply rely on offensive cyber capabilities to attack their rivals; indeed, the cyber domain represents a whole new crisis management dimension that NATO might be forced to tackle in the future.

Finally, technological acceleration and diffusion could further complicate NATO's traditional crisis management capabilities by either strengthening small and resource-scarce actors with novel military systems or by making NATO's intervention more difficult. First, automatic weapons and improvised explosive devices have grown increasingly accessible since the end of the Second World War, enabling organized non-state actors to pursue their political goals through violence.¹³⁹ Over the past twenty years, rebel and terrorist groups have exploited these and other technologies by integrating them with advanced tactics to challenge NATO member states' military superiority – with NATO's experience in Afghanistan a prime example.¹⁴⁰ Recent developments could further exacerbate these

135 F. Salem and R. Mourta, "Civil movements: the impact of Facebook and Twitter", *Arab Social Media Report* 1, No.2, January 2011; M. J. Doubek, "How disinformation and distortions on social media affected elections worldwide", *NPR*, November 2017; D. Milmo, "Rohingya sue Facebook for £150bn over Myanmar genocide", *The Guardian*, 6 December 2021; R. Chesney and D. Citron, "Deep fakes: a looming challenge for privacy, democracy, and national security", *California Law Review* 1753, 2019; K. Hao and W. D. Heaven, "The year deepfakes went mainstream in 2020", *The MIT Technology Review*, 24 December 2020.

136 *Op. cit.*, *The exponential age: how accelerating technology is transforming business, politics and society*.

137 C. Major and C. Mölling, "More than wishful thinking? The EU, UN, NATO and the comprehensive approach to military crisis management", *Studia Diplomatica*, Vol.62, No.3, 2009, pp.21-28.

138 "Cruise missiles in the Middle East", International Institute for Strategic Studies, London, September 2021; A. H. Cordesman, "The changing military dynamics of the MENA region", CSIS, Washington, DC, March 2021; *Op. cit.*, "Ballistic and cruise missiles in the Middle East: the current landscape and options for arms control"; A. Gilli *et al.*, "The revenge of the machines: army mechanization and counterinsurgency outcomes", *Working Paper*, 2022.

139 *Op. cit.*, "The revenge of the machines: army mechanization and counterinsurgency outcomes".

140 S. D. Biddle, *Afghanistan and the future of warfare: implications for army and defense policy*, Strategic Studies Institute, US Army War College Press, Carlisle, PA, 2002.

trends.¹⁴¹ As these actors integrate powerful and accessible technologies, the number, duration, and intensity of crises and conflicts could increase, making NATO crisis management more difficult.¹⁴² NATO could also find it more challenging to intervene in theater. For instance, the automatic generation of malicious malware samples through AI techniques will likely quicken the pace of cyber activities during crises.¹⁴³ Lastly, technological acceleration facilitates the diffusion of anti-access/area-denial capabilities, especially air defense. As a result, NATO could see some of its external intervention capabilities degraded or the areas where intervention is deemed necessary increasingly impenetrable.¹⁴⁴

Climate change and crisis management

Like the previous two megatrends, climate change will also likely impact NATO crisis management. Higher temperatures, desertification, and higher variation in seasonality will intensify the depletion of natural resources – especially water, arable land and fisheries – fomenting crises and rivalries among different groups within and across national borders. This could generate socio-political instability and even mass migration.¹⁴⁵ The negative effects of climate change will be felt more intensely in vulnerable regions, populations, and polities.¹⁴⁶ NATO partners and neighboring countries, whose economies are highly dependent on fossil fuel exports and consumption, will also be more exposed to the adverse effects of the green energy transition: many of these countries in the medium-to-long term could see a drop in the income deriving from fossil fuels export which, in

141 M. Fey, “3D printing and international security risks and challenges of an emerging technology”, *PRIF Report No.144*, 2017; R. D’Aveni, *The pan-industrial revolution: how new manufacturing titans will transform the world*, Houghton Mifflin Harcourt, New York, NY, 2018.

142 A. Zegart, “Cheap fights, credible threats: the future of armed drones and coercion”, *Journal of Strategic Studies*, Vol.43, No.1, 2020.

143 M. Rigaki and S. Garcia, “Bringing a GAN to a knife-fight: adapting malware communication to avoid detection”, 2018 IEEE Symposium on Security and Privacy Workshops, May, 2018; on the AI-enabled benefits for the defensive side see: D. Frazee, “Cyber Grand Challenge (CGC)”, Defence Advanced Research Projects Agency.

144 *Op. cit.*, “Meeting the anti-access and area-denial challenge”; B. Clark and M. Gunzinger, “Winning the airwaves: regaining America’s dominance in the electromagnetic spectrum”, Center for Budgetary and Strategic Assessment, Washington, DC, 2015; B. Clark *et al.*, “Winning the invisible war: gaining an enduring US advantage in the electromagnetic spectrum”, Center for Budgetary and Strategic Assessment, Washington, DC, 2019; National Intelligence Council, “Global trends 2040, a more contested world”, Washington, DC, 2021.

145 E. Mendenhall *et al.*, “Climate change increases the risk of fisheries conflict”, *Marine Policy*, Vol.117, 2020; C. J. Schmidt *et al.*, “Climate bones of contention: how climate change influences territorial, maritime, and river interstate conflicts”, *Journal of Peace Research*, Vol.58, No.1, 2021, pp.132-150.

146 N. von Uexkull and H. Buhaug, “Security implications of climate change: a decade of scientific progress”, *Journal of Peace Research*, Vol.58, No.1, 2021, pp.3-17; *Op. cit.*, “Beyond internal conflict: the emergent practice of climate security”.

turn, could result in various types of domestic instability.¹⁴⁷ Lastly, climate change could affect the basic means that NATO utilizes to conduct its crisis management missions. More specifically, higher temperatures, stronger currents, higher rainfall seasonality will likely negatively impact logistics and the deployment of military forces, including the depletion of critical infrastructures.¹⁴⁸ As a result, NATO could find it more daunting to intervene in areas affected by climate change, including its ability to project forces in theaters and sustain operations.¹⁴⁹ Troops will have to be trained for more extreme weather conditions, logistics will be burdened by newer or heavier needs, while some new types of equipment may be needed.

External shocks: Covid-19 and the war in Ukraine

The Covid-19 pandemic and the war in Ukraine could further exacerbate international instability and crises. Consider the case of Ukraine first. Economic deterrence and deterrence by detection failed in Ukraine. Could this incentivize China to attack Taiwan? We do not know, but we cannot rule it out.¹⁵⁰ In recent years, Russia intervened in Syria, Belarus, and Kazakhstan to crush domestic uprisings and in Armenia to halt an ongoing conflict with Azerbaijan. However, Russia's difficulties in Ukraine, including the crippling effect of sanctions and the depletion of its military capabilities on the battlefield, could weaken its capacity to support friendly governments in its near abroad.¹⁵¹ In this context, will China step in to support Russia, or instead replace it or simply permit these crises to run their course without intervention? Either way, NATO will be affected from a crisis management perspective. Russia's fading global power could increasingly motivate some NATO Allies (or even NATO as an organization) to intervene. Lastly, the Russian regime itself could also weaken internally and eventually disintegrate. A fragmented Russia would render collective defense considerably less salient but would likely constitute a massive challenge for NATO crisis management.¹⁵²

147 L. Simón *et al.*, *NATO and the South: a tale of three futures*, Real Instituto Elcano, 2021.

148 *Op. cit.*, "Climate change and NATO nuclear deterrence".

149 K. Cox *et al.*, "A changing climate: exploring the implications of climate change for UK Defence and Security", RAND Corporation, Santa Monica, CA, 2020.

150 B. Clark and D. Patt, "The Pentagon must 'campaign' against China, not hope for a goal-line stand", *Defense One*, 10 April 2022.

151 N. MacFarquhar, "For Putin, invasion is the latest in a long string of failures in Ukraine", *The New York Times*, 2 April 2022.

152 A. Kolesnikov, "Will Putin lose Russia?", *Foreign Affairs*, 3 March 2022; A. Etkind, "Defederating Russia", *Desk-Russia*, 18 April 2022.

Another worrying scenario that could derive from Russia's demising power and perception of weakening position concerns terrorism and other non-traditional threats. There is in fact evidence of countries, consider Iran for instance, which have long relied on terrorist groups as a foreign policy tool in light of their weaknesses.¹⁵³ Similarly, Russia's weakening position could open new ways to terrorist activity, for example in the Middle East and North Africa. Russia has been using mercenaries for over a decade in large parts of NATO's South and it has also recently decided to deploy them in Ukraine.¹⁵⁴ Strengthening of these groups could spiral in nefarious security developments. Increasing instability, due to the combined effect of the pandemic and the war in Ukraine, could exacerbate migration flows which, in turn, some could weaponize: Belarus is a case in point.¹⁵⁵

As discussed in the previous section, a prolonged war in Ukraine will also slow global economic growth and technological innovation. The direct effects on climate change are more uncertain, although potential restrictions on the importation of Russian oil and gas could lead countries to rely on more polluting energy sources like coal, thereby exacerbating greenhouse gas emissions, at least in the short term.¹⁵⁶ On the one hand, emerging and disruptive technologies could represent less of a threat in the context of crisis management. On the other hand, the commodity super-cycle we are observing parallel to a possible global food crisis could generate widespread instability, crises, and even outright conflict around the world. Russia and Ukraine are leading producers of fertilizers and wheat: an almost collapse in their production would exacerbate the food crisis, especially for the most vulnerable countries. Such a scenario will worsen further if leading wheat producers like India will impose export constraints – as it is already happening.¹⁵⁷ Countries like Egypt, Bangladesh, Iran, Lebanon, Tunisia, Yemen, Libya and Pakistan are among the primary importers of wheat: some of them could then observe popular uprisings due to higher energy costs and food shortages. Possibly, terrorist activities could resume and mass migrations could re-acquire the massive proportions of the pre-pandemic period.¹⁵⁸ Overall, NATO Allies will face multiple and subtle challenges.

With regards to Covid-19, China is, at the time of writing, facing major challenges due to the spread of the Omicron variant. It is too early to speculate on the implications of

153 K. Katzman, "Iran's foreign and defense policies", *CRS Report R44017*, Congressional Research Service, Washington, DC, 2021.

154 J. Losh, "Putin resorts to Syrian mercenaries in Ukraine. It's not the first time", *Foreign Policy*, 25 March 2022.

155 M. Galeotti, "How migrants got weaponized", *Foreign Affairs*, 2 December 2021.

156 B. Hart and D. Wallace-Wells, "How bad is the Ukraine war for climate change?", *New York Magazine Intelligencer*, 30 March 2022.

157 R. Jadhav, "India bans wheat exports as heat wave hurts crop, domestic prices soar", Reuters, 16 May 2022.

158 "Food security and implications of the Ukraine conflict", World Food Programme, Rome, March 2022.

these new difficulties, but we cannot rule out that current or future variants coupled with long-standing structural weaknesses affecting the Chinese economy will ultimately slow China's economic growth and by association its military expansion. Whether this will lead to internal infighting which will distract China from external issues or conversely lead the country to adopt a more assertive foreign policy to compensate for its internal domestic instability is difficult to say at this stage.¹⁵⁹

159 *Op. cit.*, "The dangers of China's decline. As China's economic miracle fades, its leaders may become more inclined to take risks"; *Op. cit.*, "The age of slow growth in China – and what it means for America and the global economy".

Trends, shocks and cooperative security

Conceptually, cooperative security rests on the premise that political and security developments beyond Allied borders can affect NATO itself. Cooperative security, then, is often understood as a shorthand for NATO's partnerships with non-NATO Allies in the Middle East and North Africa (MENA), in the Asia Pacific, and, increasingly, around the world.¹⁶⁰ Although NATO partnership schemes were launched in the 1990s, cooperative security was institutionalized as a core task only in the 2010 Strategic Concept.¹⁶¹ To that end, the logic underpinning NATO partnerships has changed throughout history. In the 1990s, partnerships served as a mechanism to project stability in Eastern Europe and the South Mediterranean region – including as a mechanism to prepare prospective NATO members for accession.¹⁶² In the 2000s, partnerships then emerged as a support structure for NATO out-of-area operations like that undertaken in Afghanistan. In the 2010s, partnerships further transitioned to broader, open-ended engagement with countries located around the world.

While it remains an open question whether cooperative security should adopt a new logic, it is self-evident that globalization has extended the geographic perimeter affecting NATO security. At the same time, the return of Great Power competition renders cooperative security inherently more difficult as the world becomes more competitive. Our analysis shows in fact that all three trends elevated in this report – the rise of China, technological acceleration and climate change – will complicate NATO's cooperative security agenda.

160 T. Flockhart, "Cooperative security: NATO's partnership policy in a changing world", *DIIS Report*, No.01, Danish Institute for International Studies, Copenhagen, 2014.

161 S. Rynning (ed.), "NATO's new Strategic Concept. A comprehensive assessment", *DIIS Report*, No.02, Danish Institute for International Studies, Copenhagen, 2011.

162 *Op. cit.*, *Defense of the West: NATO, the European Union and the transatlantic bargain*.

Rise of China and cooperative security

Cooperative security will undoubtedly grow more complicated given growing competition in the international system, as best represented by a rising China. First and foremost, cooperative security could pull NATO into regional or global disputes which the Alliance is neither prepared for nor its partnership system designed for. The fact that cooperative security entails intelligence sharing, capacity-building, training, and exercises – all relatively involved forms of cooperation – further complicates matters. The war in Ukraine, a NATO partner, and tensions over Taiwan, whose defense is an emerging security priority for NATO partners in the region (especially Japan) are two telling examples.¹⁶³ In these and other potential conflicts where partners are involved, the Alliance faces a dilemma: intervene alongside its partners, likely endeavoring beyond its mission and risking possible escalation or avoiding intervention but risking its partnerships and by association the entire core task.¹⁶⁴

Second, as the rise of China continues cooperative security could also evolve into a competition for global influence. NATO partnerships entail various activities aimed at preserving stability and security. A rising China – especially in its attempt to gain influence in regions beyond East Asia – has a different goal: entering markets, gaining political influence, accessing natural resources, and developing military installations. Under such circumstances, some partners could find themselves pressured to choose a side. Indirectly, some of China's policies, including building overseas military bases, delivering foreign arms sales, and developing critical infrastructures (like 5G networks) make cooperative security more difficult for NATO by reducing interoperability.¹⁶⁵ More specifically, capacity-building, joint training, and multinational exercises are significantly eased when partners adopt platforms that integrate easily with NATO capabilities. However, many countries could come to rely increasingly on Chinese equipment. Several Middle East countries, for instance, have in recent years experienced major interoperability issues when their Chinese-made drones could not be linked to their (Western) C4 infrastructure.¹⁶⁶ This interoperability problem could determine some countries' decision to fully adopt Chinese infrastructures rather than cope with mixed systems. Another sensitive issue concerns opportunities for Chinese espionage. Cooperative security with countries that rely extensively on Chinese

163 D. Brunnstrom, "Japan minister says necessary to 'wake up' to protect Taiwan", Reuters, July 2021.

164 O. Knox, "US opens door to new weapons, training for Ukraine", *The Washington Post*, 7 April 2022.

165 *Op. cit.*, "Finding the right role for NATO in addressing China and climate change".

166 A. Bassiri Tabrizi and J. Bronk, "Armed drones in the Middle East: proliferation and norms in the Region", *Occasional Paper*, RUSI, London, December 2018.

equipment presents several threats and challenges. China's 5G equipment, for example, is cheaper than similar equipment produced by companies registered in Allied territory. NATO partners could come to use these Chinese 5G systems – and indeed, some NATO Allies themselves planned to use Chinese 5G equipment in their own national networks – but this could in turn expose NATO capabilities and technologies to Chinese intelligence threats, thus putting the partnership in question or peril.¹⁶⁷

Technological acceleration and cooperative security

Cooperative security will also be affected by technological acceleration. While technological acceleration will generate new capabilities that better meet the needs of some partners – including, for instance, machine learning applied to long-range ISR systems against terrorism, insurgency or climate change – some technological dynamics could make cooperation between NATO and its partners more difficult. For example, technological acceleration could leave some partners vulnerable to attacks by diversifying and diffusing offensive capabilities, whether conventional, cyber, long-range precision missiles, or disinformation. A more competitive and unstable world may increase the insecurity partners face. However, this trend complicates the very logic of NATO's cooperative security: the Alliance cannot provide full-spectrum capacity-building to a plurality of partners all around the world. At the same time, as the war in Ukraine in part highlights, the credibility of the Alliance is at stake when partners are attacked and legitimate questions asked about the extent and duration of support that NATO can provide.

As the capability gaps between Allies and partners widen, moreover, capacity-building may require enhancement in terms of the platforms provided and the know-how transferred. Some partners will request more scientific, technological, and industrial cooperation, especially as NATO launches a set of initiatives, including the Defense Innovation Accelerator for the North Atlantic (DIANA), aimed at accelerating the development of emerging and disruptive technologies.¹⁶⁸ NATO is in no way obliged to acquiesce to these calls, but other actors (like China) may use this issue to gain leverage and influence. Additionally, military and digital technologies are characterized by high "lock-in" and network effects. As a result, NATO's cooperation with partners may be weakened in

167 P. Triolo *et al.*, "Eurasia group White Paper: the geopolitics of 5G", Eurasia Group, New York, NY, 2018; "Huawei: UK bans new 5G network equipment from september", *The Guardian*, 30 November 2020.

168 R. Murray, "Building a resilient innovation pipeline for the Alliance", *NATO Review*, September 2020.

the long-term if such countries opt for non-NATO platforms and technologies.¹⁶⁹ This discussion equally applies to civilian technologies – most prominently cloud computing and 5G communication networks.¹⁷⁰ Technological acceleration and diffusion could, moreover, proliferate the number of actors developing or utilizing EDTs. This raises a strategic choice for NATO Allies between arms control and international norms (for instance, related to sensitive issues such as facial recognition) and the need for NATO to maintain its technological edge.¹⁷¹

A final consideration concerns the fragmentation of the Internet. At this stage, three models are emerging: the DC Commercial model, centered on market competition; the Brussels Bourgeoise model, focused more on privacy; the Beijing Paternal model, based on centralization.¹⁷² An increasingly splintered internet is already creating high-impact structural-technical fragmentation of the global internet infrastructure, with the potential for deeper, configurative fragmentation in large swaths of online activity. From a cooperative security perspective, this could result in the balkanization of military internet infrastructure, thus impeding interoperability because of proprietary technical standards, with profound effects on NATO-Partner cooperation.¹⁷³

Climate change and cooperative security

Allies and their partners face multiple challenges deriving from climate change. First, climate change could represent a new source of instability and conflict across different spectrums and geographic areas. As with technological acceleration, then, the Alliance could find itself pulled into different and widespread crises for which its partnership schemes were simply not designed.¹⁷⁴ Second, the consequences of climate change will

169 *Op. cit.*, *Information rules: a strategic guide to the network economy*; J. S. Caverley, “United States hegemony and the new economics of defense”, *Security Studies*, Vol.16, No.4, 2007, pp.598-614.

170 *Op. cit.*, “Eurasia group White Paper: the geopolitics of 5G”; T. Maurer and G. Hinck, “Cloud security: a primer for policymakers”, Carnegie Endowment for International Peace, Washington, DC, August 2020; T. Herr, “Four myths about the cloud: the geopolitics of cloud computing”, Atlantic Council, Washington, DC, August 2020.

171 *Op. cit.*, “‘NATO-mation’: strategies for leading in the age of artificial intelligence”; R. Gottemoeller, “The standstill conundrum: the advent of second-strike vulnerability and options to address it”, *Texas National Security Review*, Vol.4, Iss.4, 2021, pp.115-124.

172 N. Petit, *Big tech and the digital economy: the oligopoly scenario*, Oxford University Press, Oxford, 2020.

173 Splintering of the internet of “balkanization” is intended as the fragmentation of the worldwide web into smaller nationally administered internets. K. O’Hara and W. Hall, *Four internets: data, geopolitics, and the governance of cyberspace*, Oxford University Press, Oxford, July 2021.

174 H. Buhaug, “Climate change and conflict: taking stock”, *Journal Peace Economics, Peace Science and Public Policy*, Vol.22, No.4, 2016; *Op. cit.*, “Beyond internal conflict: the emergent practice of climate security”.

affect Partners' ecosystem services and, ultimately, their economies. For example, an increase in the intensity and frequency of droughts will impact both fishing and agriculture, leading to food shortages and an increase in global food prices. Some Partners might be forced to cope with domestic instability and find themselves unable to sustain their military capabilities, with harsher weather conditions like desert storms, flooding, and extreme rainfall undermining Partners' military platforms, training, and infrastructures.¹⁷⁵ Third, for some Partners climate change may emerge as their primary security threat, thereby leading to calls for NATO to allocate more resources towards humanitarian assistance and disaster relief in support of the Alliance's partners.¹⁷⁶ Finally, and closely related, the economic and military implications of climate change are likely to place NATO in competition with other actors in providing necessary and timely assistance against negative climate effects. Some Partners will increasingly need mitigation and adaptation measures: it remains unclear, however, whether NATO will be willing or able to provide such support, especially when other actors could step in.

External shocks: Covid-19 and the war in Ukraine

The Covid-19 pandemic and the war in Ukraine generates additional uncertainty when it comes to cooperative security. First of all, globalization is increasingly criticized, as global supply-chains are not designed to cope with major exogenous shocks such as the pandemic or a major interstate conflict.¹⁷⁷ International companies from NATO Allies and their Partners are already strengthening the resilience of their supply-chains to reduce risks associated with further exogenous shocks. This means, *inter alia*, that dependence on Chinese products will shrink. As a result, however, Chinese companies will search for new markets, thus increasing competition for customers. At the same time, bottlenecks caused by the global economy's rebound from Covid-19 pandemic and by the war in Ukraine are exacerbating scarcity in energy, essential materials, and commodities. Also in this case, competition to secure such critical supplies will increase and thus China's commercial diplomacy will likely grow more aggressive.¹⁷⁸ Such competition for markets and supplies

175 *Op. cit.*, "Finding the right role for NATO in addressing China and climate change".

176 *Op. cit.*, "Green defense: the defense and military implications of climate change for Europe".

177 *Op. cit.*, "The end of globalization?".

178 *Op. cit.*, "The dangers of China's decline. As China's economic miracle fades, its leaders may become more inclined to take risks"; *Op. cit.*, "The age of slow growth in China. And what it means for America and the global economy".

will likely take on a geopolitical connotation and translate into competition for influence. The key question when it comes to Cooperative Security is whether NATO Allies want to see this core task through these prisms or not.

Second, several developing countries could be destabilized by growing energy prices, rising interest rates and food supplies scarcity resulting from the twin shock of the pandemic and the war in Ukraine. Multiple countries are highly dependent on wheat and fertilizers produced in Ukraine and Russia, and their ballooning national debts accumulated in their response to Covid-19 will further deteriorate their financial and economic position. We can reasonably expect that many of these countries will seek out support from NATO Allies, China, or other actors. The width and depth of support that NATO Allies are willing to provide their Partners in these cases remains an open question.

Dilemmas, challenges and tensions for NATO

In summary, the trends and shocks identified above will directly affect NATO's ability to execute its core tasks. In this chapter, we move one step further and investigate the indirect and non-intuitive interactions between these forces and outline the implications these interactions will bear for NATO. Overall, our analysis suggests that in the years ahead the Alliance will face multiple dilemmas and increasingly difficult trade-offs with regards to its mission and core tasks.

NATO's major dilemmas

In light of the major changes we are observing, we must investigate NATO grand strategy, including NATO priorities and the execution of its strategy. The effects of the trends and shocks we have identified will leave NATO at a crossroads, where the Alliance will be forced to respond to concomitant and competitive issues.

Preserving cooperation or preparing for competition? NATO's effectiveness as a defensive Alliance and an international security provider depends not just on its ability to address the security threats facing the Allies. Such effectiveness is inextricably linked to the health and robustness of the liberal international order, of which NATO remains a foundational cornerstone. Several dynamics are weakening the liberal international order today, including the rise of China, technological acceleration, and climate change. If the liberal international order weakens further or in the more extreme circumstance collapses, NATO will struggle to fulfill its mission. To that end, Allies will confront the first dilemma: should the Alliance work to preserve the liberal international order or should Allies instead directly prepare for what comes next? In the former case, Allies might find themselves unprepared for a more competitive world should efforts to shore up the liberal international order fail. In the latter case, Allies risk accelerating a process which will undermine their own security.

Current or future threats? The trends discussed in this report raise a further dilemma for

the Alliance. The rise of China, technological acceleration, and climate change are each major forces in world politics. Their impact on the Alliance remains uncertain. However, some Allies will legitimately doubt whether they should assign equal importance to these three forces as they do to other relevant issues – for instance, Russian aggressiveness or international terrorism.¹⁷⁹ The answer and decision may be of a political nature, yet it involves a clear strategic planning dilemma related to the Alliance's finite resources. If NATO Allies prioritize more immediate threats to Euro-Atlantic security like Russia or terrorism, they might find themselves unable to face other long-term challenges like China or climate change due to a lack of available resources, thereby mortgaging their future security in favor of current security issues. The opposite also holds true. By focusing on China or climate change, NATO might neglect more immediate threats, thus possibly undermining individual Allies' security and its ability to execute its current missions. The war in Ukraine seems to have forced the choice upon NATO Allies, with Russia clearly emerging as a priority. Still, this addresses the dilemma only in part, as over the next decade the Alliance will continue to manage crises while preparing for future challenges.

Climate change or China? Even if NATO Allies agree that future threats should stand as an Alliance priority, further dilemmas will emerge. Consider the tension that exists between tackling China and climate change. These two issues cannot be realistically handled at the same time without making some sacrifices. China is the first country in the world for greenhouse gas emissions but also a critical actor in the production of renewable technologies.¹⁸⁰ Any attempt by NATO Allies to confront China will likely carry an unavoidably negative impact in terms of mutual cooperation on climate change. Conversely, cooperation with China on climate change risks leaving the door open to growing Chinese aggressiveness and assertiveness, with direct ramifications for Allied security, including a further weakening of the liberal international order.

Trends and tasks. The final trade-off NATO Allies will face concerns the interaction between the identified trends and NATO's core tasks. In particular, the focus on climate change and the related energy transition could potentially jeopardize the Alliance's core tasks of collective defense and crisis management. With respect to collective defense, a rapid energy transition could have profound implications on the manufacturing supply-chains of the automotive, shipbuilding and aerospace industries. Since these supply-chains directly contribute to defense production, NATO Allies transitioning to green technologies run the risk of undermining their defense industrial base and their capacity to produce weapons

179 *Op. cit.*, "Finding the right role for NATO in addressing China and climate change".

180 *Op. cit.*, "Green defense: the defense and military implications of climate change for Europe".

systems. We cannot assess the changes and magnitude of this risk and further analysis is probably needed. We suspect, however, that policy intervention will be required, both to support the transition and to preserve critical manufacturing companies that will be most negatively affected.

With respect to crisis management, similar considerations apply. Currently, NATO Allies in Europe are increasing their reliance on energy sources from Azerbaijan, Algeria, Libya, Egypt, and Gulf countries to reduce their dependency on Russian gas and oil.¹⁸¹ The energy transition aims to reduce the consumption of fossil fuels *tout court*. This leads to two complex dynamics with potentially negative ramifications. On the one hand, the absolute levels of oil and gas consumption globally could fall over the coming decades: this will likely reduce these countries' income and general economic, political, and social instability.¹⁸² On the other hand, the share of oil and gas NATO Allies currently consume will simply transition to other countries and regions. In this case, NATO Allies will likely lose political influence with these oil and gas suppliers. Either way, NATO's cooperative security could foreseeably lose traction over the next decade and beyond.

Challenges to internal consensus

The war in Ukraine fostered an immediate and unexpected unity within NATO. Due to the dilemmas outlined above, however, that unity could be strained in the near future. NATO Allies will thus face difficult choices, each of which carries political opportunity costs that could drive a wedge between Allies and corrode the unity of the Alliance.

Consensus and distributional consequences. Whenever major changes occur in the international system, including changes induced by the trends we have identified above, winners and losers invariably emerge.¹⁸³ These large-scale changes redistribute power and wealth, generate new hierarchies, and institute novel patterns of dependence and interdependence. Some countries will benefit more from increased trade with a rising China while others may perceive it as a threat to their security and the international system more broadly. Technological acceleration similarly rewards some skills and capabilities (like software engineering and specialized know-how) while punishing others. As a result, some countries

181 M. Ozawa, "The Russia-Ukraine war and the European energy crisis", *Op. cit.*, "War in Europe: preliminary lessons", pp.41-53.

182 *Op. cit.*, "Green Defense: the defense and military implications of climate change for Europe".

183 *Op. cit.* "Technological change and grand strategy".

will see their industries thrive while others will endure a difficult period under advancing digitalization, thus endangering different political and strategic objectives which may even be in opposition to one another.¹⁸⁴

The Alliance will not be immune from these developments. Very few “Big Tech” companies reside in Europe, for instance, and its economic environment and innovation ecosystem is less capable of generating and exploiting technological innovations. This creates an inevitable tension with North America over issues such as tax residency and industrial regulation.¹⁸⁵ Along the same lines, climate change will affect countries asymmetrically, with some regions being more vulnerable than others to extreme weather and shifting climate patterns. It will also generate new inequalities within the context of the green energy transition, with some countries in a better position to adopt new technologies leaving others behind. This will create further winners and losers within and beyond the Alliance, thus promoting internal and external political frictions.¹⁸⁶ Finding a consensus in times of relative calm among multiple players is already difficult; achieving such consensus in an increasingly dynamic and uncertain setting will be undoubtedly more challenging. Technological acceleration renders this endeavor even more difficult because of the decoupling between the times of technology and those of politics.¹⁸⁷ As such, we expect that consensus-building within NATO will grow more tumultuous and difficult in the years ahead.

Strategic consensus and operational decisions. Even if Allies can effectively build consensus regarding their strategic priorities, we expect further difficulties to emerge when the Alliance attempts to execute this consensus at the strategic and operational levels. For instance, agreement on the potential threat represented by China requires a common strategy, one that will likely raise various disagreements when discussing implementation. For example, should Allies opt for a division of labor when managing security in relation to China, with some focusing primarily on the Indo-Pacific (the US, the UK, France and maybe Germany) and others contributing to European security? Alternatively, should the prioritization of China prompt the Alliance to re-design its posture in order to contribute to the command of the commons? And lastly, should a NATO strategy for China include aspects that govern

184 W. C. Wohlforth, “Realism and the end of the Cold War”, *International Security* 19, No.3, 1994, pp.91-129; R. L. Schweller and P. Xiaoyu, “After unipolarity: China’s visions of international order in an era of US decline”, *International Security*, Vol.36, No.1, 2011, pp.41-72; *Op. cit.*, “Power, globalization, and the end of the Cold War: reevaluating a landmark case for ideas”.

185 K. Sahin and T. Barker, “Europe’s capacity to act in the global tech race charting a path for Europe in times of major technological disruption”, *Report 6*, German Council on Foreign Relations, Berlin, 2021.

186 *Op. cit.*, “Must the energy transition be slow? Not necessarily”; *Op. cit.*, “The geopolitics of energy security in Europe, between legacy and transformation”; *Op. cit.*, *The geopolitics of energy security in Europe*; *Op. cit.*, *L’energia del mondo. Geopolitica, sostenibilità, green New Deal*; *Op. cit.*, *The new map: energy, climate, and the clash of nations*.

187 *Op. cit.*, *The exponential age: how accelerating technology is transforming business, politics and society*.

issues such as technology, energy, and access to overseas bases and natural resources? Each choice carries profound implications; as such, we expect consensus-building to be difficult. For some NATO countries, specialization on European security means forfeiting their political and strategic influence in the Indo-Pacific – an outcome many would consider unacceptable. Similarly, were NATO to focus on maintaining a command of the commons, major investments in newer capabilities will be necessary – possibly at the cost of other crucial assets. Finally, competing with China on technology or natural resources could harm bilateral trade, which for some Allies is substantial.

Tensions around NATO's core tasks

Since the end of the Cold War, NATO has twice introduced a new core task through a new Strategic Concept.¹⁸⁸ For the current Strategic Concept, a recurrent debate then concerns whether NATO should rethink its core tasks. In recent months, several suggestions have been made to that effect. Daniel Hamilton, for instance, recommends that NATO add “resilience” to its core tasks. Equally, Hans Binnendijk and Timo S. Koster recommend that NATO add “conserve stability” – in other words, promoting the international rules-based order while safeguarding democratic values and human rights.¹⁸⁹ While we agree with the contents of these proposals, we remain skeptical: strategy is about priorities; adding priorities does not necessarily improve a strategy but instead runs the risk of leading to mission creep and overextension. Instead, we believe coping with the changes that are on the horizon will require NATO Allies to prioritize existing core tasks, both hierarchically (by elevating one task over another) and horizontally (by focusing and delineating their boundaries).

From competition to contradiction between core tasks? Another challenge for the Alliance concerns the relationship between each core task: in particular, because of the changes described in this document, NATO core tasks are not only in competition with one another, but potentially even in contradiction. The war in Ukraine is telling, as it places NATO's collective defense priorities in conflict with its core tasks of crisis management and cooperative security. The longer the war lasts, the longer NATO Allies and EU members will maintain

188 *Op. cit.*, *Enduring Alliance: a history of NATO and the postwar global order*; *Op. cit.*, “A strategic odyssey: constancy of purpose and strategy-making in NATO, 1949-2019”; *Op. cit.*, “NATO strategy documents: 1949-1969”; K. Egeland, “Spreading the burden: how NATO became a ‘nuclear alliance’”, *Diplomacy & Statecraft*, Vol.31, No.1, 2020, pp.143-167.

189 H. Binnendijk and T. S. Koster, “NATO needs a new core task”, *Defense News*, 22 July 2020; D. S. Hamilton, “One plus four: what NATO's new Strategic Concept should say and how to achieve it”, *Orbis*, Vol.66, Iss.1, 2022, pp.26-34.

their sanctions against Russia. However, sanctions will not just harm Moscow's military campaign, they will also further contribute to the rise of international prices of energy, materials, food, and commodities. Global gas prices have already risen by some 50 percent since the beginning of 2022, while prices for wheat, barley, and fertilizer (largely produced in Ukraine, Russia, and Belarus) increased by 21, 33, and 40 percent respectively in March 2022.¹⁹⁰ From a collective defense perspective, the sanctions appropriately serve NATO's political and strategic goal of halting Russia's aggression and depleting its economic and military power.¹⁹¹ From a crisis management and cooperative security perspective, however, sanctions could fuel instability in NATO's periphery and for its Partners: increasing energy and food prices will in fact reduce the purchasing power of lower income countries.¹⁹²

In the case of Ukraine, the Alliance faces a further dilemma. If our analysis is correct, the war in Ukraine calls not only for more collective defense investments, but also greater resource allocation for crisis management and cooperative security. However, resources are scarce. The Alliance will be forced to make a choice. On the one hand, the prioritization of collective defense risks broader instability in the medium-to-long term in regions outside the Alliance. On the other hand, in a competitive world the absence or reduced intensity of NATO out-of-area engagements could open the door for other actors like China to increase their influence and undermine NATO. Additionally, as access to natural resources, energy and commodities grow more important (including as a consequence of the war in Ukraine), a more direct NATO engagement and involvement abroad might be necessary to preserve the Alliance's broader security, including its non-military security, i.e. energy.¹⁹³

Where do NATO's core tasks end? The transformations we have discussed in this report highlight another major tension related to NATO's core tasks: their geographical, functional, and conceptual boundaries. During the Cold War, NATO ensured Allied security in the Euro-Atlantic area, deliberately excluding territorial possessions outside of this region. Different developments, primarily related to the rise of China and technological acceleration, place in question the boundaries of collective defense. On the one hand, globalized supply-chains put collective defense at risk as NATO Allies' weapon systems depend on technologies developed all around the world. Does this mean that collective defense should expand functionally to defense investment, armament production, and general supply-chain issues

190 J. Nicas, "Ukraine war threatens to cause a global food crisis", *The New York Times*, 20 March 2022; M. Durisin, "Food prices jump most on record as war sparks supply chaos", *Bloomberg News*, 8 April 2022.

191 S. Bendett, "Russia's artificial intelligence boom may not survive the war", *Defense One*, 20 April 2022.

192 E. Sand and S. Freeman, "The Russian sanctions regime and the risk of catastrophic success", *War on the Rocks*, 8 March 2022.

193 *Op. cit.*, *National Defense Strategy of the United States of America*; *Op. cit.*, *The return of great power rivalry. Democracy versus autocracy from the ancient world to the US and China*; *Op. cit.*, "China and the return of great power strategic competition".

in the commercial world? On the other hand, some threats like cyberwarfare, hypersonic missiles, and information warfare defy borders. With these challenges, it is difficult to establish where collective defense begins and ends. This is particularly evident when thinking in terms of NATO's deterrence posture. If hypersonic weapons, for instance, located in another region beyond the Euro-Atlantic, represent a threat to NATO, the question is whether NATO should develop a deterrence posture towards that or any part of the world. Similar considerations apply to cyber warfare.¹⁹⁴

Crisis management and cooperative security face analogous challenges. These two core tasks emerged when NATO confronted no direct military competitor and when international crises primarily involved low-intensity conflicts and resource-scarce actors. The transformations at play have fueled the return of Great Power competition and expanded the types of crises that NATO will confront. Defining the geographical extension and the political logic of the Alliance's out-of-area engagement will become of crucial importance. With respect to crisis management, the tasks that NATO carried out in the past, including peacekeeping and peace-enforcing in Bosnia-Herzegovina and Kosovo, humanitarian intervention in Libya and Kosovo, and counter-insurgency and development in Afghanistan were of a relatively limited nature; it would be an entirely different challenge to step up in a conventional war between third parties. In this case, the Alliance would be forced to commit significant political, military, and financial resources. NATO could rule out intervention in such instances, but this, we believe, would question the very essence of crisis management and in cases involving Partners also the reputation and credibility of the Alliance.

This brings us to cooperative security. So far, NATO's Partnership system has grown without a clear long-term strategy. Instead, it was created to meet immediate strategic pressures and political goals. This is especially true for the Partners Across the Globe (PAG) scheme, which includes an extremely diverse group of countries located across multiple regions, including South America (Colombia), the Middle East (Iraq), Asia (Pakistan, Mongolia, Japan and the Republic of Korea) and Oceania (Australia and New Zealand). The return of Great Power competition highlights the importance of partnerships around the world, especially for securing access to critical natural resources as well as for technological cooperation or intelligence sharing. The war in Ukraine, however, highlights those partnerships entail responsibilities. Currently, NATO Allies are individually supporting Ukraine's resistance against Russia alongside the shield of the European Union's economic power (sanctions and funds) and NATO's military force (deterrence and defense). As the world becomes more competitive, some NATO Partnerships could be

194 M. Smeets, "The strategic value of offensive cyber operations", *Strategic Studies Quarterly*, Vol.12, No.3, pp.90-113, 2018.

tested by competitors or adversaries: another priority for the Alliance could thus consist of delineating a coherent and effective logic for its partnership system.

Conclusion

The Alliance finds itself at a critical juncture in its history. The external supports that enabled NATO to successfully face strategic competition in the past are weakening while changing geopolitical circumstances are endangering its post-Cold War grand strategy. Cooperative security, for instance, will inevitably grow more difficult as the world becomes more competitive. The changes we are observing will likely make it harder for NATO to execute its existing core tasks, all while raising profound questions regarding NATO's future strategy. In this context, Allies must confront at least three aspects of NATO's role and identity in the near future.

The first aspect pertains to NATO's strategic awareness. This report has highlighted the critical importance of identifying future challenges and understanding their broader implications. The rapid pace of change occurring in a plurality of domains requires that we deepen our understanding of diverse topics, explore their mutual interactions, and derive their most pressing consequences for NATO. In other words, strategic-level analysis is acquiring greater salience; however, developing an understanding of such complex issues is neither an easy process nor a quick one. Some of the most pressing questions facing the Alliance today require true interdisciplinarity. This in turn calls for groups composed of individuals with widely varying expertise. Such an approach to strategic-level analysis is not particularly dominant at this time. Still, NATO could fill this gap internally. One solution is to exploit and expand its Executive Development Program in order to conduct such studies. Otherwise, NATO could strengthen its net assessment capabilities, a suggestion that echoes the NATO 2030 Expert Group's report. Because of its nature, net assessment operates in modes more similar to a start-up than a traditional intelligence or research office, thereby posing unavoidable political and bureaucratic challenges that must be considered. Since several NATO Allies have a long-standing interest in net assessment but few have so far created such a capability, there is a strong case for NATO to step in and provide a common capability for all members. Another option, also building on the 2030 Group of Experts' report, concerns the creation of a NATO University, mimicking the European Union with the College of Europe or the European University Institute. This solution has multiple benefits, including ensuring that high-quality education, research, and expertise are generated and preserved on NATO issues.

Second, a strong understanding of the future is only one condition needed to guarantee

future security. Allies must also develop, adopt, and execute the appropriate strategies and policies that stem from this understanding. Given the transformations we are witnessing and the varied effects they will impose upon the Allies, we expect political cohesion between and amongst Allies to become more challenging in the future. The rise of China, technological acceleration and climate change will not only strain NATO's ability to execute its three core tasks, they will also pit these tasks against one another. Thus, consultation among Allies will grow even more important. At the political level, a more robust consultation process may be desirable for NATO. Moreover, expanding NATO dialogue among Allies on topics that fall outside NATO responsibilities but affect collective security would likely bolster Alliance cohesion. These include the rise of China, technology policy, climate change but also global democratization, stability in the Indo-Pacific, energy markets, trade, and technology regulations – all of which affect Allies' security and well-being.

At the strategic level, ensuring coherency between Allies' various strategies without harming their effectiveness will become increasingly important. NATO should not try to homogenize countries' strategies. Indeed, it has neither the power to do so nor is such an approach in its interest. Instead, one of NATO's comparative advantages rests on its Allies plurality of views and capabilities. NATO can, however, favor more frequent and intense dialogue among the Allies to ensure a better understanding of one another's strategies. In doing so, the Alliance should look to include younger generations. Young people living in the Alliance may not fully understand or appreciate its importance, yet no political debate regarding NATO will enjoy sustained relevance or cohesion if it does not involve in a diverse group of citizens – including the younger generation in particular.

Finally, as the rise of China, technological acceleration, and climate change increasingly complicate NATO's ability to execute its core tasks, NATO will be forced to review a number of its policy stances. After the 2010 Strategic Concept, for example, NATO Allies reviewed their *Nuclear Deterrence and Defense Posture* in order to adapt to new strategic realities; in the wake of a tumultuous decade characterized by an expansion of global nuclear arsenals, nuclear saber-rattling, the emergence and consolidation of nuclear enhancing capabilities like cyber and hypersonic weapons, a new review of the Alliance's *Nuclear Deterrence and Defense Posture* would be welcome. Beyond nuclear issues, the war in Ukraine and the Covid-19 pandemic have highlighted new challenges. The pandemic revealed that military readiness and logistics can be abruptly disrupted by non-military threats; meanwhile, Russia's invasion of Ukraine has made the Alliance's deterrence and defense needs more pressing. We foresee that some capabilities, like integrated air and missile defense, will acquire renewed salience. In light of Finland's and Sweden's bid to join NATO, moreover, other aspects will emerge, including a potential update of NATO's

military strategy and the adaptation of NATO Command and Force Structure.

When introduced in the 1991 and 2010 Strategic Concepts, respectively, crisis management and cooperative security were designed to address emerging security challenges in an era characterized by Great Power peace. The return of Great Power competition and the rise of new, unconventional threats challenges these core tasks, however. Adversaries operate below the threshold of war, non-state hackers target critical infrastructures exploiting the opportunities opened by accelerating digitalization, and transnational phenomena like the Covid-19 pandemic highlight the porousness of national borders and their vulnerability to new threats. NATO Allies and Partners (not to mention other neighboring countries) will continue to see their security affected by proximate and far-away challenges.

In light of NATO's intervention fatigue, crisis management and cooperative security could be reconfigured as part of a broader package of multidomestic resilience measures aimed at addressing non-traditional threats, including cyber threats, disinformation, mass migrations, and economic and societal resilience, amongst many others. To do so effectively, however, NATO would have to review how it works with its partners, in the three categories of states, international organizations, and the private sector. While NATO can now count on Partners spread all around the world, such partnerships are no longer adapted to the three strategic shifts described in this report. The logic that should drive such a reconceptualization – geographical and functional – is ultimately a political question. In any case, the implications that will emerge from the shifts constituted by climate change, the rise of China, and technological change will be strategic, and will require more than just tactical or operational adjustments. What is therefore required is a sustained and continuous effort, with the new Strategic Concept and beyond, that aims to move the Alliance forward.

NDC Publications (2018-2022)

NDC Policy Briefs

2018

The internal nature of the Alliance's cohesion

Thierry Tardy

NDC Policy Brief 1, October 2018

Projecting stability in practice? NATO's new training mission in Iraq

Kevin Koehler

NDC Policy Brief 2, October 2018

Challenges and potential for NATO-Egypt partnership

Adel El-Adamy

NDC Policy Brief 3, November 2018

The Great War legacy for NATO

Ian Hope

NDC Policy Brief 4, November 2018

European defence: what impact for NATO?

Thierry Tardy

NDC Policy Brief 5, December 2018

Will artificial intelligence challenge NATO interoperability?

Martin Dufour

NDC Policy Brief 6, December 2018

NATO-EU maritime cooperation: for what strategic effect?

Stefano Marcuzzi

NDC Policy Brief 7, December 2018

2019

Energy security in the Baltic Region: between markets and politics

Marc Ozawa

NDC Policy Brief 1, January 2019

NATO's nuclear deterrence: more important, yet more contested

Michael Rühle

NDC Policy Brief 2, January 2019

Vostok 2018: ten years of Russian strategic exercises and warfare preparation

Dave Johnson

NDC Policy Brief 3, February 2019 (8 pages)

Preparing for “NATO-mation”: the Atlantic Alliance toward the age of artificial intelligence

Andrea Gilli

NDC Policy Brief 4, February 2019

NATO at 70: modernising for the future

Rose Gottemoeller

NDC Policy Brief 5, March 2019

NATO's coming existential challenge

Karl-Heinz Kamp

NDC Policy Brief 6, March 2019

“NATO@70”: still adapting after all these years

Julian Lindley-French

NDC Policy Brief 7, March 2019

NATO is doing fine, but the Atlantic Alliance is in trouble

Bruno Tertrais

NDC Policy Brief 8, April 2019

70 years of NATO: the strength of the past, looking into the future

Kori Schake, with Erica Pepe

NDC Policy Brief 9, April 2019

NATO at 70: enter the technological age

Tomáš Valášek

NDC Policy Brief 10, April 2019

Building the airplane while flying: adapting NATO's force structure in an era of uncertainty

Sara Bjerg Moller

NDC Policy Brief 11, May 2019 (8 pages)

What NATO's counter-terrorism strategy?

Kris Quanten

NDC Policy Brief 12, May 2019

Why the Baltics matter. Defending NATO's North-Eastern border

Sven Sakkov

NDC Policy Brief 13, June 2019

The necessary adaptation of NATO's military instrument of power

Jan Broeks

NDC Policy Brief 14, June 2019

Deterring hybrid threats: the need for a more rational debate

Michael Rüble

NDC Policy Brief 15, July 2019

Russia and China: "axis of convenience" or a "stable strategic partnership"?

Marc Ozawa

NDC Policy Brief 16, July 2019

NATO and EU training missions in Iraq – an opportunity to enhance cooperation

Niels Schafranek

NDC Policy Brief 17, August 2019

Fighting "Men in Jeans" in the grey zone between peace and war

Peter Braunn

NDC Policy Brief 18, August 2019

From hybrid warfare to "cybrid" campaigns: the new normal?

Antonio Missiroli

NDC Policy Brief 19, September 2019

The role of democracy and human rights adherence in NATO enlargement decisions

Eyal Rubinson

NDC Policy Brief 20, September 2019 (8 pages)

What NATO contribution to the security architecture of the Indo-Pacific?

Jean-Loup Samaan

NDC Policy Brief 21, October 2019

The enhanced Forward Presence: innovating NATO's deployment model for collective defence

Christian Leuprecht

NDC Policy Brief 22, October 2019 (8 pages)

NATO at 70: what defence policy and planning priorities?

Patrick Turner

NDC Policy Brief 23, October 2019

Calibrating the scope of NATO's mandate

Thierry Tardy

NDC Policy Brief 24, November 2019

Imitation, innovation, disruption: challenges to NATO's superiority in military technology

Andrea Gilli and Mauro Gilli

NDC Policy Brief 25, December 2019

2020

Alliance capabilities at 70: achieving agility for an uncertain future

Camille Grand and Matthew Gillis

NDC Policy Brief 1, January 2020

It's that time of the decade again: some considerations for NATO's eighth Strategic Concept

Jeffrey H. Michaels

NDC Policy Brief 2, January 2020

The case for NATO's global partnership with India

Abdurrahman Utku HacIoglu

NDC Policy Brief 3, February 2020

Turkey's military policy in Syria: implications for NATO

Can Kasapoglu

NDC Policy Brief 4, February 2020

No time to hedge? Articulating a European pillar within the Alliance

Jens Ringsmose and Mark Webber

NDC Policy Brief 5, March 2020

Scoping NATO's environmental security agenda

Michael Rühle

NDC Policy Brief 6, March 2020

Time for a NATO strategy on North Korea?

Tina J. Park

NDC Policy Brief 7, April 2020

The NATO Pipeline System: a forgotten defence asset

Dominik P. Jankowski

NDC Policy Brief 8, April 2020

Projeter la stabilité au Sud : l'autre défi de l'OTAN
Projecting Stability to the South: NATO's other challenge
Chloé Berger
NDC Policy Brief 9, May 2020

NATO's needed offensive cyber capabilities
Ion A. Iftimie
NDC Policy Brief 10, May 2020

NATO and CSDP: party and public positioning in Germany and France
Konstantin Gavras, Thomas J. Scott, Jason Reifler, Stephanie Hofmann, Catarina Thomson, Matthias Mader, Harald Schoen
NDC Policy Brief 11, June 2020

NATO's strategic redirection to the South
Stephen J. Mariano
NDC Policy Brief 12, June 2020

NATO and 5G: what strategic lessons?
Andrea Gilli
NDC Policy Brief 13, July 2020

Revitalizing NATO's once robust standardization programme
Paul Beckley
NDC Policy Brief 14, July 2020

NATO and the COVID-19 emergency: actions and lessons
LtGen Olivier Rittmann
NDC Policy Brief 15, September 2020

A renewed collective defense bargain? NATO in COVID's shadow
Sten Rynning
NDC Policy Brief 16, September 2020

Catalyst or crisis? COVID-19 and European Security
Claudia Major
NDC Policy Brief 17, October 2020

COVID-19 and the defence policies of European states
Alice Billon-Galland
NDC Policy Brief 18, October 2020

The interstate conflict potential of the information domain
Dumitru Minzarari
NDC Policy Brief 19, November 2020

China in the COVID world: continued challenges for a rising power
Bates Gill
NDC Policy Brief 20, November 2020

The pandemic and the military: towards total defense?
Antonio Missioli and Michael Rühle
NDC Policy Brief 21, November 2020

Russian Grand Strategy and the COVID-19 crisis
Andrew Monaghan
NDC Policy Brief 22, December 2020

“NATO 2030. United for a new era”: a Digest
Thierry Tardy
NDC Policy Brief 23, December 2020

2021

Deterrence by detection: using surveillance to pre-empt opportunistic aggression
Thomas G. Mahnken and Grace B. Kim
NDC Policy Brief 1, January 2021

Operation Althea and the virtues of the Berlin Plus Agreement
L.Gen. Olivier Rittmann
NDC Policy Brief 2, January 2021

NATO's eastern flank: retooling the US-Baltic security link
Andris Banka
NDC Policy Brief 3, February 2021

Central European security: history and geography matter
Marcin Zaborowski
NDC Policy Brief 4, February 2021

The strategic argument for a political NATO
Heather A. Conley
NDC Policy Brief 5, March 2021

The global dimensions of NATO's future posture
Michael Clarke
NDC Policy Brief 6, March 2021

NATO 2030 – The Military Dimension
Heinrich Brauss and Christian Mölling
NDC Policy Brief 7, April 2021

Jihadi radicalization: between the local and the global
Olivier Roy
NDC Policy Brief 8, April 2021

Net assessment: “competition is for losers”
Andrea Gilli
NDC Policy Brief 9, May 2021

NATO, strategy and net assessment
Nicolò Petrelli
NDC Policy Brief 10, May 2021

Towards New Transatlantic Relations?
Cynthia Salloum
NDC Policy Brief 11, June 2021

Adapting NATO-Russia dialogue
Marc Ozawa
NDC Policy Brief 12, June 2021

NATO 2030 and the out-of-area conundrum
Gorana Grđić
NDC Policy Brief 13, July 2021

What Russian-Israeli cooperation in Syria?
Dima Course
NDC Policy Brief 14, September 2021

European allies and the forthcoming NATO Strategic Concept
Barbara Kunz
NDC Policy Brief 15, September 2021

Partners Across the Globe and NATO’s Strategic Concept
Gorana Grđić
NDC Policy Brief 16, October 2021

The US in NATO: adapting the Alliance to new strategic priorities
Alexandra De Hoop Scheffer and Martin Quencez
NDC Policy Brief 17, October 2021

Future warfare, future skills, future professional military education

Andrea Gilli

NDC Policy Brief 18, November 2021

NDC@70: more relevant than ever

Stephen J. Mariano

NDC Policy Brief 19, November 2021

The future of NATO

Thierry Tardy

NDC Policy Brief 20, November 2021

Biden's nuclear posture review: what's in it for NATO?

Andrea Chiampan

NDC Policy Brief 21, December 2021

2022

NATO and human security

Mary Kaldor

NDC Policy Brief 1, January 2022

Russia's "total confrontation" on the Eastern flank

Marc Ozawa

NDC Policy Brief 2, January 2022

NATO and the Women, Peace and Security Agenda

Julia Ruschbenko

NDC Policy Brief 3, February 2022

The rise of China and NATO's new Strategic Concept

Markus Kaim and Angela Stanzel

NDC Policy Brief 4, February 2022

Lessons from NATO's intervention in Afghanistan

Benjamin Zyla and Laura Grant

NDC Policy Brief 5, March 2022

The "dos and don'ts" of strategy making

Marina Henke

NDC Policy Brief 6, March 2022

Cool change ahead? NATO's Strategic Concept and the High North
Elizabeth Buchanan
NDC Policy Brief 7, April 2022

The war in Ukraine and the future of Russia-China relations
Marcin Kaczmarski
NDC Policy Brief 8, April 2022

Is Russia a threat in emerging and disruptive technologies?
Katarzyna Zysk
NDC Policy Brief 09, May 2022

Protecting NATO's security community
Alexandra Gheciu
NDC Policy Brief 10, May 2022

NDC Research Papers

Projecting stability: elixir or snake oil?
Edited by Ian Hope
NDC Research Paper 1, December 2018

NATO's futures: the Atlantic Alliance between power and purpose
Sten Rynning
NDC Research Paper 2, March 2019

A strategic odyssey: constancy of purpose and strategy-making in NATO, 1949-2019
Diego A. Ruiz Palmer
NDC Research Paper 3, June 2019

Russia's military posture in the Arctic - managing hard power in a "low tension" environment
Mathieu Boulègue
NDC Research Paper 4, July 2019

NATO and the EU. The essential partners
Edited by Gustav Lindstrom and Thierry Tardy
NDC Research Paper 5, September 2019

The brain and the processor: unpacking the challenges of human-machine interaction
Edited by Andrea Gilli
NDC Research Paper 6, December 2019

The Alliance five years after Crimea: implementing the Wales Summit pledges
Edited by Marc Ożawa
NDC Research Paper 7, December 2019

NATO at 70: no time to retire
Edited by Thierry Tardy
NDC Research Paper 8, January 2020

COVID-19: NATO in the age of pandemics
Edited by Thierry Tardy
NDC Research Paper 9, May 2020

Recalibrating NATO nuclear policy
Edited by Andrea Gilli
NDC Research Paper 10, June 2020

Russia's emerging global ambitions
Marcin Kaczmarewski, Wojciech Michnik, Andrew Monaghan, Marc Ożawa, Vasile Rotaru
NDC Research Paper 11, July 2020

NATO's strategic foundations: values, deterrence, and arms control
Edited by Stephen J. Mariano
NDC Research Paper 12, September 2020

Russia's energy policy. Dependence, networks and special relationships
Marc Ożawa and Ion Alexandru Ifimie
NDC Research Paper 13, October 2020

Lessons from the Enhanced Forward Presence, 2017-2020
Edited by Alexander Lanoszka, Christian Leuprecht, and Alexander Moens
NDC Research Paper 14, November 2020

“NATO-Mation”: strategies for leading in the age of artificial intelligence
Andrea Gilli with Mauro Gilli, Ann-Sophie Leonard and Zoe Stanley-Lockman
NDC Research Paper 15, December 2020

Russia in NATO's South: Expansionist Strategy or Defensive Posture?
Edited by Chloé Berger and Cynthia Salloum
NDC Research Paper 16, January 2021

NATO 2030: new technologies, new conflicts, new partnerships
Edited by Thierry Tardy
NDC Research Paper 17, February 2021

NATO strategy: integrating defense and collaborative security
Schuyler Foerster and Jeffrey A. Larsen
NDC Research Paper 18, March 2021

Principles of Nuclear Deterrence and Strategy
Bruno Tertrais
NDC Research Paper 19, May 2021

Regional Powers and Post-NATO Afghanistan
Edited by David G. Lewis and Aniseh Bassiri Tabrizi
NDC Research Paper 20, June 2021

NATO and the Future of Arms Control
Edited by Dominik P. Jankowski
NDC Research Paper 21, November 2021

Challenges to NATO's nuclear strategy
Edited by Andrea Gilli
NDC Research Paper 22, December 2021

War in Europe: preliminary lessons
Edited by Thierry Tardy
NDC Research Paper 23, May 2022

Russian Studies (since 2018)

The Russian State Armament Programme, 2018-2027
Julian Cooper
Russian Studies 1, May 2018

Russian weapons in the Syrian conflict
Douglas Barrie; Howard Gethin
Russian Studies 2, May 2018

Preparation and conduct of military actions in local wars and armed conflicts
Charles K. Bartles
Russian Studies 3, October 2018

Russia's Arctic Papers: the evolution of strategic thinking on the High North
Nazrin Mehdizyeva
Russian Studies 4, November 2018

Waiting for the storm: South Caucasus

Ray Finch

Russian Studies 1, January 2019

Fundamentals of the state policy of the Russian Federation in the field of naval activities for the period until 2030

Richard Connolly

Russian Studies 2, January 2019

Development strategy of state corporation Rosatom to 2030

Nazrin Mehdijeva

Russian Studies 3, March 2019

General Gerasimov on the vectors of the development of military strategy

Dave Johnson

Russian Studies 4, March 2019

In the service of Russia

Gudrun Persson

Russian Studies 5, June 2019

NATO in modern world politics

Ray Finch

Russian Studies 6, November 2019

Russia's strategy for the development of marine activities to 2030

Richard Connolly

Russian Studies 7, November 2019

Russian thoughts on hybrid war and colour revolutions

Gudrun Persson

Russian Studies 1, January 2020

“Topographic maps: the scientific principles of their content” and “Military topography”

Alexander J. Kent

Russian Studies 2, February 2020

The overhaul of Russian strategic planning for the Arctic Zone to 2035

Elizabeth Buchanan

Russian Studies 3, May 2020

Russian views of Iran

Ray Finch

Russian Studies 4, December 2020

Strategy of development of the Arctic Zone of the Russian Federation and the provision of national security for the period to 2035

Nazrin Mehdijeva

Russian Studies 1, June 2021

Russia's updated National Security Strategy

Julian Cooper

Russian Studies 2, July 2021

Defining Russian military science

Charles K. Bartles

Russian Studies 3, July 2021

Lengthening the bridge: the role of current weapons and emerging technologies in expanding the pre-nuclear phase of conflict

Dara Massicot

Russian Studies 4, July 2021

Russian thinking on the role of AI in future warfare

Anya Fink

Russian Studies 5, November 2021

“Burya na Kavkaze” [Storm in the Caucasus]

Rob Lee

Russian Studies 1, January 2022

Russian “principles of victory in combat” and MCDP-1 Warfighting

Clint Reach and Anthony Atler

Russian Studies 2, February 2022

Escalation and deescalation of crises, armed conflicts, and wars

Clint Reach

Russian Studies 3, March 2022

The problems of the applied theory of war

Nazrin Mehdijeva

Russian Studies 4, May 2022

