Studying China's Military Power

Analytical framework and methods

Oscar Almén and Christopher Weidacher Hsiung (eds.),
Johan Englund, Frida Lampinen, Per Olsson

FOI-R--5760--SE

August 2025

FOI

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Title	Studying China's Military Power – Analytical framework and methods
Titel	Att studera Kinas militära makt – Analytiskt ramverk och metoder
Report No.	FOI-R--5760--SE
Month	August
Year	2025
Pages	113
ISSN	1650-1942
Customer	Ministry of Defence
Research Area	8. Security Policy
Project No.	A12450
Approved by	Malek Finn Khan
Division	Defence Analysis

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Sammanfattning

Kina utvecklar snabbt sina militära förmågor och den kinesiska befrielsearmén (PLA) utgör idag en modern och alltmer kapabel militär makt. Hur Kina kommer att fortsätta att utveckla sina militära förmågor, hur landet resonerar kring användandet av militär makt eller vill använda sina ökande militära resurser för att uppnå politiska och strategiska mål utgör en central frågeställning för global säkerhet och politik.

Denna rapport utvecklar ett analytiskt ramverk för att studera militär makt i allmänhet och Kina i synnerhet. Rapporten diskuterar metodologiska aspekter och tillvägagångsätt vad gäller studiet av Kinas militära makt, samt tecknar en litteraturöversikt över existerande forskning av Kinas militära makt och PLA. Rapporten innehåller även en översikt över Kinas militära styrkor och Kinas militär-industriella bas.

Det övergripande syftet med rapporten är att utveckla en konceptuell och metodologisk grund för kommande och regelbundna rapporter och studier om Kinas militära makt.

Nyckelord: Militär makt, internationell säkerhet, Kina, PLA

Summary

China is rapidly improving its military capabilities, transforming the People's Liberation Army (PLA) into an increasingly sophisticated and capable force. How China continues to develop its military power, how it thinks about the use of force, and how it seeks to employ military means to achieve broader political and strategic objectives will significantly shape global security and international politics in the decades to come.

This report designs an analytical framework for studying and assessing military power in general and China's military power in particular. It provides a discussion of research methods and presents an overview of the existing field of research on China's military and the PLA. The report also includes a description of the PLA's force structure and equipment and China's defence-industrial base.

The overarching aim of the report is to establish a conceptual and methodological foundation for future reports and recurring studies on China's military power.

Keywords: Military power, international security, China, PLA

Preface

FOI's Asia Programme studies security policy developments in and around East and South Asia. This report is the first in a forthcoming and recurring report series on the study of China's military power commissioned by the Swedish Ministry of Defence.

Several people have helped to significantly improve and secure the quality of this report by reviewing individual draft chapters or versions of the full report. From FOI, we especially thank Johan Norberg, Björn Ottosson, Jan Frelin, and Mattias Burell. From outside FOI, we thank Henrik Stålhane Hiim (Norwegian Institute for Defence Studies, IFS); Sofia Ledberg (Swedish Defence University, FHS); Cortez A. Cooper III and Mark Cozad (RAND Corporation); Joel Wuthnow (National Defense University, NDU); and Nan Tian (Stockholm International Peace Research Institute, SIPRI).

We also wish to express our gratitude to all the officials, experts, and scholars we met during two separate study trips conducted as part of this study: one trip to Brussels and London in April 2024, and one to Taiwan in October 2024. The conversations and discussions held greatly helped our thinking in defining the scope and content of the report.

Finally we wish to thank Richard Langlais, who edited the language, and Karin Blext for assisting with the report's layout.

All remaining errors are our own.

Stockholm, August 2025
Oscar Almén
Deputy Research Director and Asia Programme Manager

Executive summary

- The overarching objective of the report is to establish a conceptual and methodological foundation for a forthcoming, recurring report series on China's military power.

- The report series is driven by two motivations: first, to provide a complement to the US-dominated research field on China's military. Research from outside the US, whether from Europe, East Asia, or any other part of the world, may offer different perspectives on and experiences of China's military power. Second, to build up Swedish expertise on the Chinese military, as this issue is of increasing relevance for Sweden.

- In the study, we define military power as the ability to influence international relations by the use or threat of military force to obtaining strategic objectives.

- This report develops a general analytical framework for studying and assessing military power, with specific application to China. It includes a discussion of research methods and an overview of the current field of research on China's military and the PLA. The framework is designed to be flexible and adaptable across different conflict scenarios and contexts.

- The framework consists of three integrated analytical blocks: (1) resources, referring to the material assets at a state's disposal; (2) perceptual inputs, referring to how a state views the utility of military power as an instrument for achieving strategic objectives; and (3) conditional factors, which encompass variables that shape, positively or negatively, how effectively a state can translate existing capabilities and resources into military power. Taken together, the framework offers a structured, open-ended tool for conducting holistic assessments of military power.

- The literature overview finds that most analysts assess that China's military has significantly strengthened its capabilities in recent decades. However, the military's crucial weaknesses and challenges, such as its lack of combat experience or capabilities in undertaking joint operations, are also identified in the literature.

- Moreover, although research has come a long way in studying China's military, much remains to be studied and analysed in order to better understand China's military power, both in obvious areas, such as the modernisation of its force structure, and in non-material areas such as ideational frameworks and strategic thinking regarding its use of military resources and power.

- The study discusses specific methodological issues in studying China's military power, including access to different sources and data, and other challenges of researching a sensitive subject in an authoritarian setting.

- Despite the Chinese government's efforts to censor and limit access to information, there are still numerous sources available that can help provide a better understanding of China's military power. The report argues for a broad approach to the study of military power and for using different combinations of research methods depending on the issue to be examined.

- The report describes the rapid and comprehensive military modernisation of the PLA. Over the last two decades, the PLA has been transformed from an outdated and underfunded force into a modern military with state-of-the-art equipment. The rapid expansion of its surface navy and the ongoing build-up of stealth fighters are among the most prominent examples.

- However, China still only spends about one-third as much as the United States on its military and the PLA continues to lag behind the US Armed Forces in several key areas, such as combat aircraft, command and control assets, aircraft carriers, and nuclear submarines.

- That said, China has steadily reduced its military spending and technology gaps with the West over the past two decades. Moreover, while questions remain about the exact performance details of Chinese military equipment, China is increasingly fielding more advanced designs with a greater degree of domestic innovation.

- The report also examines China's defence industry. A well-functioning, capable, innovative, and self-reliant defence-industrial base is a central and crucial resource for achieving the PLA's development goals through 2050. Significant efforts are underway to develop military AI and autonomous technologies to enable "intelligentised" warfare, although the fielding of these capabilities is likely some years away.

- Despite China's advanced industrial capabilities, full self-reliance remains a long-term objective. However, the Party-state's commitment to improving the technological capacity of the defence sector creates favourable preconditions for the PLA to make progress, assuming this is not interrupted by major crises. Still, success is dependent on a sustained level of financial support, progressive leadership backing, and improved incentive structures within the defence market.

Abbreviations

ABCT	Armoured brigade combat team
ADIZ	Air Defense Identification Zone
AECC	Aero Engine Corporation of China
AEW&C	Airborne early warning & control
AI	Artificial intelligence
APC	Armoured personnel carrier
Art	Artillery
ASPI	Australian Strategic Policy Institute
ATGM	Anti-tank guided missile
AVIC	Aviation Industry Corporation of China
BRI	Belt and Road Initiative
BRICS	Brazil, Russia, India, China, South Africa (original member countries)
CAEP	China Academy of Engineering Physics
CAIC	Changhe Aircraft Industries Corporation
CASC	China Aerospace Science and Technology Corporation
CASI	China Aerospace Studies Institute
CASIC	China Aerospace Science and Industry Corporation
CASS	Chinese Academy of Social Sciences
CATOBAR	Catapult-assisted take-off barrier-arrested recovery
CCP	Chinese Communist Party
CEC	China Electronics Corporation
CETC	China Electronics Technology Group Corporation
CICIR	China Institute of Contemporary International Relations
CIIS	China Institute of International Studies
CINC	Composite index of national capability
CIT	Conflict intelligence team
CMC	Central Military Commission
CMC EDD	Central Military Commission Equipment Development Department
CNGC	China North Industries Group Corporation (also known as NORINCO)
CNKI	China National Knowledge Infrastructure
CNNC	China National Nuclear Corporation
CNP	Comprehensive National Power
CNSC	Central National Security Commission
COMAC	Commercial Aircraft Corporation of China

CSGC	China South Industries Group Corporation
CSSC	China State Shipbuilding Corporation
DIA	Defense Intelligence Agency
DIB	Defence-industrial base
DJI	SZ DJI Technology Co Ltd
DOD	Department of Defense
DOTMLPF	Doctrine, organisation, training, materiel, leadership and education, personnel, facilities
DSTKL	Defence Science and Technology Key Laboratory
ERA	Explosive reactive armour
ESA	European Space Agency
FOBS	Fractional orbital bombardment system
FOI	Swedish Defence Research Agency
GAD	General Armaments Department
HGV	Hypersonic boost glide vehicle
HIMARS	High mobility artillery rocket system
ICBM	Intercontinental ballistic missile
IFV	Infantry fighting vehicles
IISS	International Institute for Strategic Studies
IR	International relations
ISW	Institute for the Study of War
JADC2	Joint All-Domain Command and Control
JLSC	Joint logistic support centres
LCAC	Landing craft, air cushion
LCM	Landing craft, mechanised
LCU	Landing craft, utility
LHD	Landing helicopter dock
LO	Low observability
LPD	Amphibious transport dock, landing platform dock
LSM	Landing ship, medium
LST	Landing ship, tank
MANPAD	Man-portable air-defence systems
MBT	Main battle tanks
MER	Market exchange rate
MIIT	Ministry of Industry and Information Technology
MIRV	Multiple independently targetable re-entry vehicle
MLRS	Multiple-launch rocket system
MND	Ministry of National Defense Republic of China (Taiwan)
MSS	Ministry of State Security
MUM-T	Manned-unmanned teaming

NATO	North Atlantic Treaty Organization
NBC	Nuclear, biological and chemical
NDU	National Defense University
NoBAS	Nordic Baltic Association for Asian Studies
NORINCO	China North Industries Group Corporation (also known as CNGC)
NPC	National People's Congress
OBOR	One Belt, One Road
OPFOR	Opposing force
OSINT	Open source intelligence
PAP	People's Armed Police
PLA	People's Liberation Army
PLAA	People's Liberation Army Army
PLAAF	People's Liberation Army Air Force
PLAASF	People's Liberation Army Aerospace Force
PLACSF	People's Liberation Army Cyberspace Force
PLAGF	People's Liberation Army Ground Force
PLAISF	People's Liberation Army Information Support Force
PLAJLSF	PLA Joint Logistics Support Force
PLAN	People's Liberation Army Navy
PLANAF	People's Liberation Army Navy Air Force
PLARF	People's Liberation Army Rocket Force
PLASSF	People's Liberation Army Strategic Support Forces
PPP	Purchasing power parity
PRC	People's Republic of China
R&D	Research and development
SASAC	State-owned Assets Supervision and Administration Commission
SASTIND	State Administration of Science, Technology, and Industry for National Defence
SCO	Shanghai Cooperation Organization
SIPRI	Stockholm International Peace Research Institute
SOE	State-owned enterprise
SSBN	Nuclear-powered ballistic missile submarines
SSK	Tactical conventional submarine
SSN	Tactical nuclear submarine
S&T	Science and technology
STOBAR	Short take-off, barrier-arrested recovery
UAV	Unmanned aerial vehicle
UNPKO	United Nations Peacekeeping Operations
US	United States
UUV	Unmanned underwater vehicle
VLS	Vertical-launch system

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1. Introduction

Oscar Almén and Christopher Weidacher Hsiung

The transformation of the People's Liberation Army (PLA) into a world-class military is now fully underway, a fact that should be clear to any observer.[1] China's defence spending is second only to that of the United States. It has the world's largest standing army and the largest fleet by numbers of ships. Perhaps more importantly, China's military modernisation is turning the PLA into a technologically advanced force better prepared to fight both modern and future wars.

This important development has naturally resulted in a large body of research aimed at analysing, understanding, and assessing China's military power. Some of these studies are long-running, continuously updated, and based on an impressive volume of data.[2]

This report is the first in a series of planned reports on China's military power. The report series has two overarching motivations. The first is to provide a complement to the American perspective. Most available and authoritative research on China's military power is conducted in the United States. The US has a unique experience of, and relationship with, China, which influences its research perspective. For the US, China is, and for some time now has been viewed as, the pacing challenge, so it is natural that much analysis has been focused on China.[3]

Research from outside the US, whether from Europe, East Asia, or elsewhere, may offer different and additional perspectives on, and experience with, China's military power. A Swedish study will not necessarily compare China to the US, but may, for example, place relatively more emphasis on how China's rising military power affects Europe and small states. Since Europe is less likely than the US to become directly involved in a military conflict with China, other aspects of China's military power, such as the cyber or space domains, may be emphasised in the analysis.

The second motivation is to build up Swedish expertise. In-depth systematic studies of China's military power are lacking in Sweden. There is a need in Sweden, and in Europe more broadly, to enhance its competence and knowledge regarding China's growing military capabilities and how its leadership seeks to use military power to protect and advance its interests, not only in East Asia but also globally. By strengthening Swedish expertise in this area, the Swedish Defence Research Agency (FOI) intends to provide government and policy actors with independent analysis of China's potential military and strategic implications for Sweden.

There are several reasons for this urgency. Security in the Euro-Atlantic and Indo-Pacific regions is becoming increasingly interlinked. On the one hand, China's support for Russia and its war against Ukraine has a direct impact on the security situation in Europe and Sweden. On the other hand, security challenges in the Indo-Pacific, such as a possible military conflict in the Taiwan Strait or in the South China Sea, would affect trade flows from the region, thus increasing European and NATO involvement in the Indo-Pacific and directly impacting Sweden's highly trade-dependent economy.

Because Sweden is a member of both EU and NATO, it is even more vital to understand the military and security situation in the Indo-Pacific region. Moreover, as the US perceives China as its main challenge, the current US administration has decided to prioritise force deployments to the Indo-Pacific region over Europe. Finally, China's push to modernise its military could affect Sweden's high-tech industry, forcing it to implement stronger safeguards against industrial espionage or unintended transfers of advanced dual-use technologies.

1 At the 19th Party Congress, 2017, Xi Jinping declared that the PLA should be a world-class force by 2050. Zhao Lei. PLA to be world-class force by 2050. *China Daily*. (October 10 2017). *https://www.chinadaily.com.cn/china/2017-10/27/content_33756453.htm* (accessed 2024-05-09).

2 The research field on China's military power is covered in Chapter 3 of this report.

3 In 2020, for the first time in public, then Secretary of Defence Mark Esper used the term *pacing threat* when referring to China. U.S. Department of Defense. Secretary of Defense Mark T. Esper Message to the Force on Accomplishments in Implementation of the National Defense Strategy. (July 7 2020); U.S. Department of Defense. *Military and Security Developments Involving the People's Republic of China 2022*. Annual Report to Congress (2022), p. II.

Aim of this report

This first report has two aims. First, it aims to contribute to research on military power in general and China's military power in particular. While military power is a well-studied subject, how best to analyse it is a continuously evolving research subject marked by long-standing disagreements. This report contributes to the field by presenting a general analytical framework for the study of military power. This is reinforced through its inclusion of an overview of previous research, methodology, and source materials on the study of China's military power that are intended to be of value to others working in the field of China military studies.[4]

The second aim is to present a general analytical framework by developing a conceptual and methodological foundation for a series of forthcoming studies on China's military power that FOI's Asia programme plans to produce. As noted above, this first report forms part of a long-term, comprehensive research project initiated by the Asia programme to examine how to study and assess China's military power and its implications for Sweden.[5] The objective is to produce recurring reports on China's military power every three to four years, modelled after FOI's two existing series on Russian Military Capability and Western Military Capability.[6] In many ways, this study is inspired by, and builds on, the experience of those two series.

1.1 Outline

This first report presents our initial research design, providing a conceptual and methodological framework not only for how to analyse military power in general, but also for how to analyse China's military power more specifically. Our approach to military power is broad in the sense that we do not focus solely on the military hardware assets of the PLA, but also take into account other factors such as threat perceptions, training, organisational and bureaucratic aspects, and military diplomacy. The aspiration is that this report will function as an analytical foundation guiding us on how to further analyse and assess Chinese military power across different issues. When viewed holistically, this can ultimately function as a comprehensive assessment of China's military power.

This first report also contains two empirical chapters: one on the PLA's military force structure and equipment, and one on the Chinese defence industry. In addition to their empirical contribution, these chapters are included to demonstrate how we envisage future reports connecting the analytical framework with individual chapters. We have chosen to include these two empirical topics as they represent what we later refer to as material resource capabilities.[7] Material resources must function as a baseline for any study and assessment of a state's military power, including that of China. It should be emphasised again, however, that material resources make up only one part of a country's military power, and thus represent only a part of our forthcoming reports. Hence, this report is different from future reports in that it focuses more on theory and method and less on empirics and actual analysis of China's military power.[8]

One additional point of clarification should be made. This study focuses on China's military power and makes no *structured* comparison to other military powers. However, throughout this report, particularly in Chapter 5, occasional comparisons are made with other major powers' militaries. This primarily means the US, since from the Chinese perspective, the US military is the benchmark against which the PLA measures itself. These occasional comparisons help to provide context for China's military power. Future reports in the series will use a similarly limited comparative approach.

The report begins with a chapter (Chapter 2) dealing with the concept of military power. It contains an overview of how military power has been dealt with in the field of international relations theory and security and military studies. It also explores different ways to relate to the broader concept of power and examines some general conceptual and methodological issues as many of these issues also are valid for how to think about military power more specifically. The chapter further

4 This complements and builds on previous efforts of this kind including Peter Mattis. *Analyzing the Chinese Military: A review Essay and resource Guide on the People's Liberation Army* (The Jamestown Foundation, 2015); and James Mulvenon & Andrew Yang. *A Poverty of Riches: New Challenges and Opportunities in PLA Research* (Santa Monica: RAND Corporation, 2003).

5 In addition to these recurring comprehensive reports, separate studies on specific aspects of China's military power will be conducted continuously in order to, step by step, develop the building blocks of the overall analysis.

6 Some of the more recent reports: Fredrik Westerlund & Susanne Oxenstierna (eds.). *Russian Military Capability in a Ten-Year Perspective –2019*. FOI-R--4758--SE (Stockholm: Swedish Defense Research Agency, 2019); Björn Ottosson and Krister Pallin. *Western Military Capability in Northern Europe 2023. Part 1: National Capabilities*. FOI-R--5527--SE (Stockholm: Swedish Defense Research Agency, 2024).

7 In our analytical framework, we refer to this as the resource block.

8 While the chapters in this report are related to, and often refer to each other, they can also be read independently. This is also why some of the abbreviations are spelled out several times throughout the report.

explains how this study defines the concept of military power and how it can be used. Chapter 2 ends with presenting a broad analytical framework for the study of military power, which is meant to guide our subsequent reports on China's military power more specifically.

Chapter 3 then provides an overview of previous research outside China on China's military power. The main objective of the chapter is to provide a summary of some of the literature and topics relating to the broader issue of China's military power, and to relate them in part to the analytical framework developed in Chapter 2.

Chapter 4 focuses on research methods. First, it briefly discusses methods and sources for studying military power in general. It then moves on to address these questions specifically in relation to China. It examines the particular challenges of studying Chinese military power and the PLA, such as how to interpret Chinese official propaganda and the issue of limited or complete lack of access to sources. The chapter ends by reconnecting with the analytical framework presented in Chapter 2. By adding a methodological dimension to the framework, it suggests different ways to operationalise and study the dimensions of military power set out in the analytical model.

Chapters 5 and 6 are two empirical chapters. Chapter 5 describes the resources available to the Chinese military. It briefly outlines the PLA as an organisation and China's military expenditure, but focuses on the force structure, equipment and the ongoing modernisation of the PLA. The chapter mainly focuses on the resources of the four services, namely, the ground force, navy, air force, and rocket force of the PLA. Chapter 6 similarly presents an overview and analysis of China's defence industry. The chapter explores the main actors within the defence-industrial base and the types of procurement the leadership prioritises in building the PLA's future capabilities. As noted above, in addition to their empirical value, these chapters serve as examples of how chapters in the series' forthcoming volumes are likely to be structured and how they relate to our analytical framework.

The report finishes with a concluding chapter that discusses some ending observations of the report and presents an outline for the forthcoming reports of China's military power. ■

2. Overview of the study of military power

Christopher Weidacher Hsiung

This chapter outlines the concept of military power as understood in international relations theory and the literature of security and military studies. The aim of the chapter is not to provide an exhaustive overview but rather to sketch an initial conceptual understanding of how military power can be studied in general terms, which can then serve as a springboard to examine and analyse China's military power specifically.

The chapter is structured as follows. First, we provide a survey of the general debate in the literature on what constitutes power. This is necessary, as military power is only one of many components or elements of what is commonly conceptualised as power and thus cannot be entirely separated from it. The debate on power is rich and multifaceted, and our purpose is not to account for all aspects and perspectives, but only to highlight important issues relevant to the aim of this study. Second, a review is provided of how *military* power is specifically defined and conceptualised in the literature, with emphasis on what constitutes military power and how it is estimated and assessed, while also highlighting prevailing conceptual limitations and methodological challenges. Third, based on the preceding discussion, the chapter proposes a general analytical framework for studying and assessing military power—a framework that will be used in our subsequent report series as a guiding tool for analysing China's military power. The chapter ends with a conclusion.

2.1 Approaches to the study of power

The study of power constitutes a core research agenda in international relations theory and security studies. The interest of academics and policy analysts in the concept has produced a rich body of important knowledge and insights on the sources, mechanisms, and effects of power in international affairs.[9]

Within the *realism* paradigm, perhaps the international relations theoretical paradigm most concerned with power, the concept lies at the heart of its thinking.[10] For realists, international politics, like all other domains of politics, is ultimately a struggle for power. As the classical realist Hans Morgenthau once noted, "whatever the ultimate aims of international politics, power is always the immediate aim."[11] According to John Mearsheimer, another realist thinker, power calculations are the key operational principle for states, defining how they perceive the world around them and how they behave accordingly.[12]

Realists place a high premium on analysing and estimating material resources, in particularly military resources. In fact, military power is regarded by realists as the key determinant in explaining international politics and state behaviour. As political scientist Michael Beckley puts it, "Military power is widely considered to be the most important variable in international

9 For an in-depth overview of the concept and research programme of power in international relations theory, see David A. Baldwin. *Power and International Relations. A Conceptual Approach* (Princeton University Press, 2016).

10 It should be noted that realism is not a unified theoretical paradigm and there are many different subtypes of realism. For an overview, see, for example, Stephen G. Brooks. Dueling Realism. *International Organisation* Vol. 51, no. 3 (1997): pp. 445–477. Furthermore, among the various strands of realism, there is disagreement about how power should be defined and measured, except for the shared assumption that power is the central concept in the study of international politics. See, for instance, Brian C. Schmidt. Competing Realist Conceptions of Power. *Millennium. Journal of International Studies* Volume 33, issue 3 (2005): pp. 523–549.

11 J. H. Morgenthau. *Politics Among Nations: The Struggle for Power and Peace*, 3rd ed. (Chicago: University of Chicago Press, 1954), p. 25.

12 John J. Mearsheimer. *The Tragedy of Great Power Politics* (New York: WW Norton & Co, 2001), p. 12.

relations because it functions as a decisive arbiter of disputes when it is used, and shapes relationships among states even when it is not."[13]

Other major theoretical perspectives in international relations theory, such as *liberalism* and *social constructivism*, also engage in the study of power, albeit with a different focus.[14] For liberalism, a key concern is to broaden the concept of power to include economic and diplomatic elements, and to demonstrate that power relations are subjected to different types of interdependent relations and networks, creating power relations and vulnerabilities that cannot always be captured by the mere possession of material resources.[15] Social constructivists, meanwhile, emphasise the role of ideas, norms, and beliefs, and the construction of social and normative practices that in turn affect state behaviour more than material attributes.[16]

That said, despite the vast amount of existing scholarship, the concept of power remains elusive, and there is no clear consensus on its definition and analytical application in social science research. The concept has even been described as hopelessly vague and meaningless, perhaps better to be discarded entirely. Nonetheless, it has proved hard to replace, and despite its shortcomings and challenges, it remains widely used in the academic study of international politics and by policy analysts and decision-makers both to estimate their own national power and to assess that of others.[17]

A central definition, still widely used as a basic starting point, is provided by the political scientist Robert Dahl. According to Dahl, power is defined as the ability of actor A to get actor B to do something that B would otherwise not do.[18] Joseph Nye, a leading international relations scholar, has claimed that in the context of international politics, this is characterised by the ability to shape politics in line with its interests. Simply put, power is something one has which makes something happen, with the intent to influence an actor or an event in accordance with one's interests.

Some scholars treat influence as a distinct concept from power.[19] However, most practices treat the terms interchangeably; the same goes for almost all standard dictionaries and common parlance.[20] Still, it is possible to view influence as the result of an action or effort in which power is exercised. Conceptualisations such as these present power as a coercive enterprise, in the sense that it pertains to the ability to get actors to act in ways that go against their original interests or preferences. This requires the analyst to know how strong another state's initial preference was and to what degree it has changed due to external efforts.[21] This perspective, however, presents an analytical challenge insofar as it is only possible to assess the extent to which a state's preferences have changed if the state's initial preference is known.

Dahl's basic definition has subsequently been criticised for missing important aspects of power. One line of critique is that Dahl's definition does not account for what some say is the ability of an actor to frame and set the agenda of a given policy area or issue. If an actor can control the agenda-setting in a way that other's interests or preferences are not made present or even considered legitimate, for instance, by using ideas or institutions to frame an issue, then power can be exercised by simply not allowing certain actors to make their case. Other aspects, famously raised by power theorist Steven Lukes, are more subtle forms of influence where ideas, beliefs, or values can shape other actors' initial preferences, goals, and desires (what he referred to as ideological power). This type of power does not, then, have to alter the behaviour of state A towards state B, since the initial preferences of state B are already shaped in a way that aligns with the outcome sought by state A. The mechanisms here more clearly point to structural

13 Michael Beckley. Economic Development and Military Effectiveness. *Journal of Strategic Studies* Volume 33, issue 1 (2010): p. 45.

14 As with realism, liberalism and social constructivism are of course very rich and diversified theoretical schools with a variety of different perspectives and approaches.

15 Robert O. Keohane and Joseph S. Nye. *Power and Interdependence: World Politics in Transition* (Boston: Little, Brown and Company, 1989).

16 Alexander Wendt. Anarchy is what states make of it: The social construction of power politics. *International Organization* Vol. 46, no. 2 (1992): pp. 391–425. An example with relevance for China, partly in this vein, is Alastair Ian Johnson's exposé of Chinese strategic thinking during the Ming Dynasty. See Alastair Ian Johnson. *Cultural Realism: Strategic Culture and Grand Strategy in Chinese History* (Princeton: Princeton University Press, 1998).

17 Joseph S. Nye. Power and Foreign Policy. *Journal of Political Power* Volume 4 (2011): pp. 9–24.

18 Robert A. Dahl. The Concept of Power. *Behavioral Science*. Volume 2, issue 3 (1957): pp. 201–215.

19 See, for instance, Ruth Zimmerling. *Influence and Power. Variations on a Messy Theme* (AA Dordrecht: Springer, 2005).

20 See Baldwin. *Power and International Relations*. pp. 6–8 and Joseph S. Nye, *The Future of Power* (New York: PublicAffairs, 2011), pp. 5–6.

21 Joseph S. Nye. The Changing Nature of Power. *Political Science Quarterly* Vol. 105, no. 2 (Summer, 1990): pp. 177–192.

settings such as the shaping of institutions, norms, and culture in a preferred way.[22]

The added dimensions to Dahl's basic definition have enriched the theoretical understanding of the power concept. While these seemingly share little with the more "traditional" military power literature (as this is largely built on realist foundations), it is important to note that several aspects of military power can be related to approaches and perspectives found within liberalism and social constructivism. For instance, as is shown below, issues such as belief systems and strategic culture in security and military studies constitute important research programmes.

Beyond these broad conceptual and methodological aspects, there are several other issues pertaining to the debate on power. Many of these relate to how best assess, estimate, and measure power. Based on our review of the literature, three major issues have been identified: power-as-resources versus power as outcome, single variables versus multivariable approaches, and material versus non-material variables. Importantly, many of these are also valid for the study of military power and guide our conceptualisation of the analytical framework designed below. It should be mentioned that these issues are less straightforward than the discussion below might suggest and, in practice, often tend to overlap and interact. However, for analytical clarity, we have attempted to treat them somewhat separately from each other.

Resources versus outcomes

The first issue relates to a division among those who study power as a resource and those who emphasise power as an outcome.[23] The power-as-resource approach means measuring power in terms of resources, for instance territory and population, natural resource endowment, economic wealth, and military assets.[24] With regard to military power more specifically, this often refers to the approach of "bean counting," where one sets out to count the inventory of combat aircraft, tanks, submarines, artillery weapons and so forth of any (or more) given militaries. The causal thinking here is straightforward; those nations with more resources are also more powerful and can thus achieve their goals and objectives more easily compared to states with fewer resources at their disposal.[25]

The power-as-resource approach is thus often equated with capabilities, which becomes the total sum of resources that can be used by one actor to influence another. Capabilities matter for states, or as Kenneth Waltz claims, "states spend a lot of time estimating one another's capabilities, especially their abilities to do harm."[26] For instance, if a state has great economic wealth, it can use that to obtain influence through a variety of economic and trade tools such as investments, loans, or aid, but also coercive means such as export controls, sanctions, or tariffs. Pertaining to military power, large military assets can be used to take or defend territory, fight overseas wars, attract allies, or be used coercively as threats of violence to extract concessions. The advantage here is that it is relatively easy to estimate a set of similar measurable indicators and readily available objective categories across different types of states.[27]

The power-as-outcome approach instead focuses on studying whether actor A was able to actually influence or shape actor B to the extent that actor A's desired goal was achieved. Here, the focus is less on measuring the available resources at hand for any given actor and more on analysing the outcome of a given international event, for instance, winning a war or successfully negotiating a beneficial trade agreement. This approach illuminates that power cannot be treated in a generic sense but must be put in context within a well-specified scope and domain. In other words, for power analysis to make sense, one should ask who gets what, under what circumstances, and on which specific issue.[28] This is often also referred to as treating power as relational.

Concerning military resources, for instance, leading military affairs scholar Stephen Biddle claims that the emphasis on treating military power as a function of a number of material variables such as economic resources, population, territory, and military size has led analysts to confuse military power with actual outcomes of military achievements.[29] Knowing which resources

22 Steven Lukes. *Power: A Radical View.* 2nd expanded edition (Basingstoke: Palgrave Macmillan, 2005).

23 Michael Beckley. The Power of Nations. Measuring what matters. *International Security* Vol. 43, no. 2 (Fall 2018): pp. 7–44.

24 Kenneth N. Waltz. *Theory of International Politics* (New York: Colombia University Press, 1979).

25 See, for instance, Paul M. Kennedy. *The Rise and Fall of the Great Powers: Economic Change and Military Conflict from 1500 to 2000* (New York: Random House, 1987).

26 Waltz. *Theory of International Politics*, p. 131.

27 Ashely Tellis, Janice Bially, Christopher Layne and Melissa McPhersson. *Measuring National Power in the Postindustrial Age* (Santa Monica: RAND, 2000), p. 14.

28 Baldwin. *Power and International Relations*, p. 114.

29 Stephen Bibble. *Military Power. Explaining Victory and Defeat in Modern Battle* (Princeton: Princeton University Press, 2004).

matter and how utilisation works efficiently, especially in a war contingency, can only be revealed after events have occurred. An oft-cited example is how the US was unable to defeat North Vietnam despite its vastly superior military assets and resources.

A related aspect here is what some scholars have claimed is the ability of states to convert material resources into efficient utilisation. Joseph Nye has called this "power conversion," which he states is the "the capacity to convert potential power, as measured by resources, to realized power, as measured by the changed behavior of others."[30] Only by understanding how a state can optimise its resources can one make more accurate predictions of outcomes.

The notion of power conversion is also similar to what some in the so-called *neoclassical realist* perspective have called "state power."[31] Pertaining more to the literature on military power, this conceptualisation is often described as military effectiveness (more on this below). Military power in this sense equals how effectively a state can utilise its resources for warfighting ends.[32] As is made evident below, this is an important insight for the design of the analytical framework for our study on China's military power.

Finally, viewing power as resources or capabilities does not make it fungible (for instance, like money), which would allow it to be applied uniformly across all domains or issue areas. Rather, it requires a consideration of which types of resources are best suited to a specific situation and a specific actor.[33] The power-as-outcome approach is useful for analysing past events, especially when a state or actor with fewer resources prevailed. If, however, the interest lies more in assessing a country's power resources or the overall balance of power between one or more states across a wide range of domains, including making qualified estimates about the future balance of power, then the power-as-resource approach is the more suitable one.[34] As shown below, our analytical framework situates itself more within a resource-based than an outcome-based approach.

Single versus multivariable approaches

The second major issue (in part methodological) relates to whether studies should use one main, or several and different, variables or factors. Single-variable studies often identify one factor claimed to function as the best proxy for measuring a state's overall power, and thus its ability to influence other states and obtain what it wants in international politics. Much of its usage stems from its simplicity and often relatively easy access to data.[35] It should be noted that a focus on one variable can often include several types of variables but within a broadly similar dimension of power.

Measuring military power and specifically different variants of military capabilities is often illustrative of this, detailing, for instance, available military assets and weapon systems or military expenditure. Other studies focus on more specific military aspects believed to have played an important role in a country's overall power and influence; Mahan's classical study on the role of sea power as an indicator of overall national power and influence is an example of this approach.[36] Other common single variables are economic indicators, for instance economic growth and national income, but also more narrowly defined factors such as control over natural resources, in particular oil and natural gas, or the ability to influence global financial markets through strong currencies such as the US dollar.[37] A single variable approach does not, of course, have to refer to quantifiable variables such as the ones just mentioned but can also include non-material factors as for example doctrine, civil-military relations (see more below).

Multivariable approaches reject the narrow focus on one specific variable or factor as too simplistic and not accurately reflecting a country's real power capabilities. Instead, proponents of this strand argue for incorporating a mix of several factors in judging a nation's power. An early and subsequently influential proponent of this approach was Hans Morgenthau, who argued that a state's elements of power include geography,

30 Nye. The Changing Nature: p. 178.

31 Norrin M. Ripsman, Jeffrey W. Taliaferro, Steven E. Lobell. *Neoclassical Realist Theory of International Politics* (New York: Oxford University Press, 2016).

32 Risa A. Brooks and Elizabeth A. Stanley (eds.). *Creating Military Power: The Sources of Military Effectiveness* (Stanford: Stanford University Press, 2007). See also Beckley, The Power of Nations.

33 Tellis et al. *Measuring National Power*, pp. 17–18.

34 Beckley. The Power of Nations: pp. 12–13.

35 Tellis et al. *Measuring National Power*, pp. 26–27.

36 Alfred Thayer Mahan. *The Influence of Sea Power Upon History 1660–1783* (Boston: Little Brown and Company, 1898).

37 Nye. *The Future of Power*, pp. 63–80

natural resources, industrial capacity, military preparedness, population, national character, national morale, and the quality of diplomacy and government.[38] Moreover, he specifically argued against claiming that one factor was more important than another. Robert Gilpin, writing some decades later, for example, combines the military, economic, and technological capabilities of states to assess national power.[39]

The multivariable approach has also led to a number of larger data-set compilations with the purpose of measuring power resources among nations, such as the Composite Index of National Capability (CINC) by the Correlates of War Project. The index includes indexed measures of material resources and capabilities, such as a state's gross domestic product (GDP) and military expenditure, and has been used as a standard tool to measure national power, especially regarding states' ability to wage war.[40] For example, RAND conducted a comprehensive study on how to conceptualise national power and devise a model for analysis.[41] Michael Beckley carried out another oft-cited study for measuring power; he argues that power measurements are better performed by also incorporating what he calls net indicators, which not only consider a state's material resources but also the costs or liabilities that they can create (for instance, a large population can both be an asset and a cost).[42]

Government-led efforts that are more policy-oriented are also common, not least in the US, with prominent examples including the net assessment project led by Andrew Marshall or other projects initiated by the US Department of Defense (DOD). Many of these projects were or are designed specifically to measure and estimate the current and future relative military balance between nations and their readiness, although their analysis also includes economic, technological, political, and other aspects beyond purely military factors.[43] Net assessments have become increasingly popular again, largely due to growing strategic great power competition in contemporary international politics.[44]

Another commonly applied analytical method used by the US and other Western militaries is the so-called DOTMLPF framework.[45] DOTMLPF stands for doctrine, organisation, training, materiel, leadership and education, personnel, and facilities and is used as a tool to assess and address potential capability gaps and concepts in order to successfully accomplish a mission. Other more specific ways of assessing states' military capabilities and performance, while accounting for a variety of factors and variables, include operational analysis or wargaming, in which specific countries interact against each other in a given conflict contingency or war scenario.[46]

Finally, it should also be mentioned that other "non-Western" countries of course have traditions of measuring and estimating military power. During the Cold War, the Soviet Union, for instance, used an analytical method known as "the correlation of forces" to describe the military balance between two opponents, relying on general quantitative and qualitative indicators for primarily operational planning by rating one side's military superiority over the other.[47] Concerning China, thinking about and assessing power has also constituted a key analytical feature. In particular, the concept of Comprehensive National Power (CNP) has been advanced by several Chinese academics and think tanks to assess and rank China's power mainly in relation

38 Hans Morgenthau. *Politics Among Nations: The Struggle for Power and Peace*, 4th ed. (New York: Alfred A. Knopf, 1967): pp. 106–158.

39 Robert Gilpin. *War and Change in World Politics* (New York: Cambridge University Press, 1981).

40 Correlates of War (COW) project homepage, *https://correlatesofwar.org/data-sets/national-material-capabilities/*. It should be emphasised that the index does not measure several other indicators that can be said to play an important role, such as technology, governance, and human capital, for instance. At the same time, some country-to-country comparisons become highly questionable, for instance, that China in the 1980s is almost on an equal footing with the US. The suggestion that China and the US were close to power parity at that time seems a bit odd, to say the least.

41 Tellis et al. *Measuring National Power.* This study helped inspire the development of our analytical framework. See more, below, in footnote 86.

42 Beckley. The Power of Nations.

43 James Jay Carafano. Measuring Military Power. *Strategic Studies Quarterly* Volume 8, no. 3 (Fall 2014): pp. 11–18.

44 Nicholas Kitchen. Making Net Assessment Work: Evaluating Great-power Competition. *Survival* Volume 66, issue 4 (2024): pp. 51–70. Net assessment is further discussed in Chapter 4.

45 There are several slightly different versions of this. For instance, NATO uses the same basic acronym but has added interoperability (DOTMLPF-I). The US has now also added policy (DOTMLPF-P). The United Kingdom has a similar baseline approach but looks at training, equipment, personnel, information, concepts and doctrine, organisation, infrastructure, and logistics inputs.

46 Erik Lin-Greenberg, Reid B. C. Pauly and Jacquelyn G. Schneider. Wargaming for International Relations Research. *European Journal of International Relations* Vol. 28, no. 1 (2022): pp. 83–109.

47 Clint Reach, Vikram Kilambi and Mark Cozard. *Russian Assessments and Application of the Correlation of Forces and Means* (Santa Monica: RAND Corporation, 2020).

to other major powers.[48] CNP is broader in scope than many similar Western approaches and models in that it aims at combining indicators of the overall conditions and strengths of a country and its power. As such, it incorporates more than just purely military and material resources and includes indicators such as political power, foreign policy, cultural influence, and education, to mention a few. There is no coherent indicator index and several Chinese scholars and research institutes have developed their own CNP concepts over the years.[49] Here, it suffices to mention the concept of CNP in a general sense, but Chinese thinking on power, and military power more specifically, will constitute one of the core features examined in forthcoming reports.

Material versus non-material variables

The third issue we highlight concerns the differing emphasis placed on material and non-material factors in the study of power.[50] It can be argued that this third issue overlaps in some respects with the discussion above on the resources-versus-outcomes approach, but it nevertheless presents several distinctive elements. It should also be noted that the divide in the literature between the material and non-material is less obvious than stated here and more often an explicit or implicit emphasis drawn by different scholars and analysts. In real life, the divide is even less clear. For analytical purposes, however, we make a clear separation.

Studies on material variables are similar to the above-noted power-as-resource approach, which places emphasis on gross indicators of readily observable indicators such as a country's economic size, territory, population, technological and scientific achievements, or military assets. The most widely used gross indicator is GDP, as most scholars and analysts consider a country's economic size and health to be the best-general indicator for gauging its potential power, given that economic resources can be converted into military strength.[51] The focus on material variables has been criticised for failing to capture the full picture of what constitutes power, with critics broadly arguing that non-material or intangible factors must also be taken into account. In terms of military power, analysts have pointed to Russia's full-scale invasion of Ukraine in 2022 as, to some extent, illustrating the significance of these factors.[52]

Non-material factors such as diplomacy, leadership legitimacy in setting up international institutions and rules, and the attraction of cultural and social norms are also important. Joseph Nye's ideas of "soft" or "non-coercive" and "smart" power are indicative of this tradition. Soft power, viewed as an alternative (or a complement) to hard power primarily derived from material resources, stems from the appeal that a state's culture, values, and political institutions hold for others, granting it a form of leadership without relying on coercion or dominance.[53] Looking at the more individual-level unit of analysis, *classical realists* include notions of prestige, greed, fear, and pride in explaining dynamics in international relations and power.[54] Finally, Robert Jervis and others have highlighted that key elements in the study of power from a non-material perspective include the notion of perceptions of power and leaders' belief systems and what they assess to be the balance of power.[55] For instance, William Wolhforth shows how the US and Soviet Union largely misperceived the military balance between the two nations, leading policymakers in the US to misjudge and misconceive the motivations of the Soviet Union.[56] While recognising the importance of incorporating non-material factors into power analysis, it must be emphasised that such variables and factors

48 The concept was introduced in 1984 after Chinese leader Deng Xiaoping asked Chinese scholars and experts to explore the future security environment as part of a study on China's strategic defense for the year 2000. See Michael Pillsbury. *China debates the future security environment*. (Washington, DC: National Defense University Press, 2000), p. 225. For an overview of Chinese views on power, see Qi Haixia. Disputing Chinese Views on Power. *The Chinese Journal of International Politics* Vol. 10, no. 2 (Summer 2017): pp. 211–239.

49 Some of the most notable of these are the Academy of Military Science (AMS), the China Academy of Social Science (CASS), the China Institute of Contemporary International Relations (CICIR), and Tsinghua University.

50 These can also be called tangible and intangible factors, or quantitative and qualitative factors. In this study we use these terms interchangeably.

51 This is what John Mearsheimer calls "latent power." See Mearcheimer. *The Tragedy of Great Power Politics*, p. 55. For a lengthy treatment of this basic view, see Kennedy. *The Rise and Fall*.

52 Maria Engqvist, Carolina Vendil Pallin, Emil Wannheden, Kristina Melin, Tomas Malmlöf, Jonas Kjellén and Johan Norberg. *Russian Military Capabilities at War: Reflections on Methodology and Sources Post-2022*. FOI-R--5502—SE (Stockholm: Swedish Defense Research Agency, 2024).

53 Joseph S. Nye. *Soft Power: The Means to Success in World Politics*, 1st ed. (New York: PublicAffairs: 2002).

54 See, for instance, Jonathan Kirshner. *An Unwritten Future: Realism and Uncertainty in World Politics* (Princeton: Princeton University Press, 2022).

55 Robert Jervis. *Perceptions and Misperceptions in International Politics* (Princeton: Princeton University Press, 1976).

56 William Curtis Wohlforth. *The Elusive Balance: Power and Perceptions during the Cold War* (New York: Cornell University Press, 1993).

create their own set of challenges, chief among them issues of how to measure and assess them.[57]

2.2 Conceptualising military power

We now proceed to discuss the issue of military power more specifically. As the preceding section shows, there is no simple definition of the concept of military power, let alone any consensus on how to measure and evaluate it. Similar challenges also exist with the narrower notion of military power. We begin by raising four interrelated issues.

First, there is no single agreed-upon definition of military power. In its simplest sense, military power can refer to a set of different (military) capabilities required for successful warfighting. Some authors argue that military power is best defined as prevailing in and winning battles and wars. Military power, therefore, corresponds to victory in war.[58] Stephen Biddle defines (military) capability slightly more narrowly as "the ability to succeed at an assigned mission," more specifically referring to mid-and high-intensity conventional land wars.[59] Andrew Marshall sees it as military potential, meaning mobilisation capability, which for him includes manpower and the industrial capacity to support forces and supply them with modern equipment.[60] John Mearsheimer holds that military power is largely based on the size and strength of a state's army and its supporting air and naval forces.[61] Mearsheimer further suggests that the militarily strongest states are those with formidable land forces, since in his view most great power wars are won primarily on land. In this sense, military power is thus often equated with military capability, which is then understood as operational proficiency or military effectiveness.

It is possible, however, to take a more expansive view, where Thomas Schelling's idea of the concept as both "brute force" and a source of coercion can be useful. Brute force (or what he also calls forcible action) can be used for defensive and offensive purposes, such as forcibly seizing and occupying land, denying, disarming, dispelling, or repelling an adversary's intrusion or attack.[62] Brute force is the direct application of military capabilities and thus comes close to the definition of warfighting power as noted by Biddle, for instance. In this sense, brute force is measurable and often relates to another actor's military assets and capabilities for military action.

Schelling also stated, however, that military power can be used for coercive action and bargaining strategies, which he divided into either deterrence or compellence measures. Deterrence refers to threats intended to make an actor refrain from taking a course of action out of fear of the consequences should such actions be taken. Compellence instead refers to threats intended to make an actor take a certain action. Such measures are highly dependent not only on the communication of and commitment to following through on posed threats, but also the resolve and willingness to endure potential costs, both from the state that deters or compels and the target state.[63]

The main point here is that such measures lack the actual application of force.[64] In essence, Schelling wants to show that military power can achieve outcomes even when military force is actually not employed (and is often the method preferred by states), or something he calls the "power to hurt."[65] This is an important insight that also informs our conceptualisation of military power; i.e. the mere possession of military power can function as an instrument to obtain influence even though that power is not actually used directly. In a slightly similar way, Robert Art describes how military power can be used in either a "physical" or "peaceful" way, where the former involves the actual employment of force and the latter refers to an explicit threat to resort to force or the implicit threat conveyed simply by having the resources to do so.[66] Within realism – noted above for putting military power at the centre of analysis—many broadly subscribe to this view of looking at both the use and threat of force. For instance, according to Stephen Walt, international security studies, meaning

57 See, for instance, Bettina Benz. Western Estimates of Russian Military Capabilities and the Invasion of Ukraine. *Problems of Post-Communism* Volume 71 (2024): pp. 219–231.

58 Ann Hironkaka. *Tokens of Power. Rethinking War* (New York: Cambridge University Press, 2017), p. 41.

59 Stephen Biddle. *Military Power: Explaining Victory and Defeat in Modern Battle* (Princeton: Princeton University Press, 2006), p. 5.

60 A. W. Marshall. Problems of Estimating Military Power. Paper presented at the American Political Science Meeting, New York, Sept. 6–9, 1996 (Santa Barbara: Rand Corporation, 1966), p. 8.

61 Mearsheimer. *The Tragedy of Great Power Politics*, p. 56.

62 Thomas C. Schelling. *Arms and Influence*. Veritas Paperback Edition 2020 (New Haven and London: Yale University Press, 1966), pp. 1–2.

63 Tami Davis Biddle. Coercion Theory: A basic introduction for practitioners. *Texas National Security Review* Volume 3, issue 2 (spring 2020): p. 101.

64 This is of course a somewhat simplified understanding. Compellence, for instance, can involve actions to force an actor to do a certain thing, that is, the threat first posed can evolve into a small but still concrete action to show resolve and commitment to follow through.

65 Schelling. *Arms and Influence*, p. xxi, pp. 2–6.

66 Robert J. Art. To What Ends Military Power?. *International Security* Volume 4, issue 4 (spring 1980), pp. 3–35.

primarily a focus on military power, is "the study of threat, use and control of military force."[67]

Partly related to this are other less direct "military-related" purposes of military power. These refer to supporting other foreign policy objectives, such as protecting overseas interests from non-traditional dangers or seeking advantage in the information space. This is accomplished through military diplomacy, the provision of public goods, information operations, arms sales, security cooperation and assistance, and military educational exchanges. These foreign policy objectives are also, in a very ordinary sense, a tool for protecting citizens or collaborating on the upholding of regional or global public goods.[68] Military power can thus function as a form of soft power, enhancing national reputation or serving the purposes of domestic status.[69] Finally, for an authoritarian state such as China, military power may be used not only against foreign rivals, it can also be directed at domestic threats and rivals.

Second, some scholars assert that military power is relational and context-dependent (as is power more broadly, as noted above). A key challenge is that any assessment of a state's military power is of limited value if it is not put in relation to another state's military power. As Andrew Marshall states, "Useful measures or estimates of military power relate to the capability of the military forces of one country to deal with the military forces of another country in a variety of interesting contingencies."[70]

In addition, military power also has an interpretative dimension. As one expert has noted: "It does little good only to know how big or advanced an army is unless we know what it is for, how it is to be used, and more importantly, how ready it is to implement what is intended."[71] Assessing relative capabilities, then, should also involve evaluating the intent or willingness of a state to actually use force as a means to achieve political goals. Ultimately, this reflects the value a state places on a given crisis or conflict issue and the level of cost it is willing to accept.

Moreover, the notion of power as fungible (noted above) is also relevant for the study of military power. Military power can mean very different things, and armed forces are expected to perform many different tasks. Successful operations or missions in one area or domain do not necessarily imply success in another.[72] For instance, what works in a conventional large-scale land war may not work in urban warfare or naval battles. For some, this means that studies should consider that states need to employ different types of military power in different policy-contingent situations in order to more accurately evaluate and estimate military power.[73]

Questions of actual and potential military power are also important to consider. For short wars, immediate comparisons and currently "existing" military capabilities might suffice. However, for long-term military conflict or wars of attrition, especially between relatively equally resourced states, how a state can mobilise and transform national resources into warfighting capabilities becomes a more crucial aspect.[74] This relates very much to what Richard Betts labels the crucial notion of military readiness—namely, the requirement that militaries are ready to fight. Betts further distinguishes between two types of readiness; operational readiness and structural readiness. Operational readiness refers to having the weapons and troops available to engage in battle immediately if called upon. The demand for immediate action, however, is contrasted with structural preparedness, which refers to the requirement for a military to be prepared to fight at a later stage, often in mid- or even long-term perspectives. The main issue, according to Betts, is that these two types of readiness create a dilemma and trade-off situation for decision-makers in striking the best balance between being prepared to fight a war immediately and investing in and building the most appropriate military assets for future conflicts and wars.[75]

Third, is the notion of power conversion or state capacity mentioned above. Some scholars, like Biddle, have particularly emphasised doctrine and strategy as

67 Stephen M. Walt. The Renaissance of Security Studies. *International Studies Quarterly* Vol. 35, no. 2 (June 1991): p. 212.

68 For instance, in the case of China, Sheena Chestnut Greitens and Isaac B. Kardon have shown that China is engaged in providing a different type of security assistance to its partners than the US is. Where the US is primarily concerned with providing assistance to deter and deny external threats, China offers security assistance, which strengthens "internal" capabilities to control a partner's territory and populations. See Sheena Chestnut Greitens and Isaac B. Kardon. Security without Exclusivity: Hybrid Alignment under U.S.–China Competition. *International Security* 49 (3) (2025): pp. 122–163.

69 Robert S. Ross. China's Naval Nationalism: Sources, Prospects, and the U.S. Response. *International Security* 34 (2) (2009): pp. 46–81.

70 Marshall. Problems of estimating; p. 2.

71 Ng Ka Po. *Interpreting China's Military Power: Doctrine Makes Readiness* (New York: Routledge, 2004), pp. 151–152.

72 Biddle. *Military Power*, p. 5.

73 Baldwin. *Power and International Relations*, p. 180.

74 Tellis et al. *Measuring National Power*, p. 21.

75 Richard K. Betts. *Military Readiness. Concepts, Choices, Consequences* (Washington, DC: Brookings Institution, 1995).

crucial in converting a state's material resources into effective war conduct, or what he refers to as "force employment."[76] Success in war or military conflict is therefore not determined by material resources alone but depends to a large extent on strategy. Others, such as Mearsheimer, also emphasise that beyond the purely material resources available, strategy functions as the most crucial additional factor.[77] Strategy is thus understood as the bridge that connects a specific political goal with military means. At the same time, context is highly important, meaning that a certain strategy, even with the same resources, may not work in another situation.[78]

Brooks and Stanley similarly highlight the importance of analysing how efficiently a state can convert resources, what they refer to as "military effectiveness." They define military effectiveness as "the capacity to create military power from a state's basic resources in wealth, technology, population size, and human capital."[79] A military's level of effectiveness, they argue, varies with the degree to which it is organised to make good use of these material and human resources. They identify four crucial attributes for measuring effectiveness: integration (integration of military activity within and across different levels); responsiveness (responsiveness to internal constraints and the external environment); skill (measured by motivation and the basic competences of personnel); and quality (indicated by the calibre of weapons and equipment). A high score on all four variables creates better conditions for converting basic resources into warfare.[80] As shown below, issues and notions of power conversion and military efficiency will play an important role in our analytical framework.

Fourth, military power should also be clarified in relation to "proximate" terms such as capability, combat power, or warfighting power. Military power is arguably the overarching term, whereas warfighting power, military strength, and military capability are sub-types. Fighting power can refer to a force's ability to conduct the most complex military operations, given its military assets, technology, doctrine, organisation, and training, both currently and in the immediate future. According to one scholar, military capabilities can be defined even more narrowly as the ability to perform specific missions at different levels of conflict, and where it is important to distinguish between different types of capabilities. A certain capability may be effective in one contingency but not in another. A closely related concept is combat power, which refers more directly to all the means available to a military formation (of any size) that can be drawn upon to employ against an opponent.[81]

A working definition of military power

Considering the above overview and survey of the literature on power and, more specifically, military power, we arrive at the following working definition of military power:

> *Military power is the ability to influence international relations by the use or threat of military force to obtain strategic goals.*

Our working definition requires five further clarifications. First, we adopt a more generic definition that is not limited to defining military power in relation to a specific (military) operation or mission. In addition, we do not have in mind a direct "relational approach" as envisioned by Dahl and Nye—that is, defining country A's military power in relation to its influence over state B. Strictly speaking, this should be included (if we are to follow Dahl). Yet, we do relate to Nye's conceptualisation of understanding power as the ability of states to influence politics in line with their own interests. Broadly speaking, however, we are more interested in providing an overall and generalised picture of military power. This understanding can then be adapted and applied to specific cases (countries, conflicts, or contingencies) when appropriate.

Second, the usage of ability refers to our interest in providing an analysis rather than measuring the actual ability to use military force and to prevail in wars or military battles. While highly relevant, such a task has proven to be extremely difficult, as noted above, and also requires that such an ability is put in relation to another state and in a specific warfighting context. That said, it is still important to provide baseline assessments of states' resources, international environment, strategic thinking, and other factors that can impact a state's ability to prevail in armed conflicts and win wars. Related to

76 Biddle. *Military Power*.
77 Mearsheimer. *The Tragedy of Great Power Politics*, p. 58.
78 Benz. Western Estimates: p. 9.
79 Brooks and Stanley. *Creating Military Power*, p. 9.
80 Ibid., pp. 9–10.
81 Kent Andersson. Notes on military capability concepts and their relevance for analysis of system characteristics. *Research Report* (Stockholm: Swedish Defense University, 2020): pp. 2–4.

this, building on Schelling's distinction of brute force and coercion, we hold that states can also use military power for coercive bargaining that does not include the deployment of actual military assets. This thus opens up analysis of a much wider set of situations and conditions where military power is used for purposes other than purely warfighting aims.

Third, we include the notion of strategic goals of a state. This is because the use or threat of military force is viewed as an instrument to reach specific strategic goals set by the state and usually not as an end goal in and of itself. A state will use its military capabilities only as these are perceived as meaningful for achieving a stated strategic objective. We should, however, state clearly that it is not our primary objective to assess or evaluate whether a state actually has achieved its stated goals (through military power), i.e. analysis of outcome, but rather try to assess what a state's strategic goals are (in our case those of China).

Fourth, by military force we refer not only to existing military capabilities and resources but also to latent capabilities at the state's disposal (the notion of latent capabilities relates to the discussion above on readiness and timeframes). Moreover, by military force we refer not only to conventional and kinetic uses of force but include also non-kinetic methods and assets used to confront an enemy. Such methods can include for example irregular warfare, disinformation, propaganda, cyberattacks and legal and political warfare which are blended with more conventional means and assets.[82] In other words, military force in our definition does not exclude so-called grey zone or hybrid warfare methods. In the case of China, this type of methods are becoming increasingly salient and used, notably in the South China Sea and against Taiwan. While the tactics used may be non-traditional, the fundamental effect is the same insofar as they inflict damage or carry the threat of inflicting damage in ways intended to coerce or deter an opponent.

Fifth, by including the notion "to influence international relations" in our definition we open up a wider set of cases and issues of international politics than only purely military conflict contingencies and war scenarios, but where the aim is to apply appropriate measures to shape an external security environment conducive to a state's strategic objective. As Michael Beckley argues, "military power influences patterns of international cooperation, trade policy, economic development, identity construction, and, of course, war causation and termination."[83] Such measures may include both the threat of use (and are thus directly related to the notion of coercion) and positive inducements such as arms sales cooperation, joint exercises and training, and the stationing of military troops on foreign soil with the hope of creating cooperative relations with other countries, and thereby decreasing the likelihood that those states go against the interests of the state undertaking the initiative.[84]

2.3 A framework for analysis

Building on the preceding discussion, we aim to provide a general analytical framework to study and assess military power. In addition, the framework draws certain inspiration from several other existing studies and attempts to provide generalised accounts of power and, in particular, military power.[85] However, the difference from previous studies is that we (1) aim to provide a broader set of variables (including variables that allow us to more systematically assess challenges and weaknesses) assembled in a holistic fashion and; (2) emphasise to a greater degree what we conceptualise as perceptual notions of how an actor views military power. This means that we situate our framework broadly within a power-as-resource approach and emphasise a multivariable rationale, while also comprehensively including non-material variables in our framework. The framework can be used to analyse any state, but, admittedly, we mainly have China in mind.

Our primary goal is to construct a general framework consisting of what we think are important factors that are helpful in conducting an analysis of a state's current and potential military power. The framework is designed to support an informed overall assessment of a state's strengths and weaknesses in terms of its military power and, ultimately, warfighting potential. It should

82 Andrew Mumford. Understanding hybrid warfare. *Cambridge Review of International Affairs* Volume 3, Issue 6 (2020): pp. 824-827.

83 Beckley. Economic Development: p. 45.

84 Kyle J. Wolfley. Military Statecraft and the Use of Multinational Exercises in World Politics. *West Point Research Papers* 129 (United States Military Academy. USMA Digital Commons, 2019).

85 For instance, we to some extent build on the RAND study by Tellis et al. *Measuring National Power in the Post-Industrial Age*. We as the RAND study are primary interested in power as resources and what can make that resource base translate into power. As with RAND we do not concern our self with specifically outcomes. The difference with RAND is that their focus was on power more broadly while we are specifically interested in military power. In addition, as noted, we more explicitly bring in the notion of how states think, view and conceptualize military power and to tease out challenges and weaknesses. Moreover, several of the indicators for how to study a specific military power has been inspired by FOI's *Russia Military Capabilities* report series (as also indicated in the introduction).

Table 2.1 Analytical framework for assessing military power

Constitutive block	Study factors
Resources	• Economy and military expenditure • Military personnel • Military equipment • Military infrastructure • Defence industry and technology
Perceptual inputs	• Assessment of international security environment • Perceptions of other states and military balance • Perceptions of internal domestic context
Conditional factors	• Geography and structure of international system • Governance • Strategy, doctrine, and operational concepts • Organisational effectiveness and training • Alliances and strategic partnerships

be clarified that the framework does not provide a blueprint for an actual estimate or measurement of military power. Moreover, it does not provide explicit analytical tools to estimate whether or not a state will succeed in any given military conflict contingency or war scenario. Neither does the framework have any ambition to be applicable in country-to-country comparisons, which are akin to more explicit net assessment, although we leave space for comparisons in more specific aspects and dimensions when appropriate. When describing and using the term *state* or *country*, we are referring to the top political leadership, policymakers, and high-ranking military officers.

Operationally, we have designed a framework consisting of three broad analytical "constitutive blocks," which we believe are crucial to consider when conducting an overarching analysis of a state's military power. The three blocks are: resources, perceptual inputs, and conditional factors. The blocks are further explained below, but, in short, *resources* refers to the material resources at a state's disposal; *perceptual inputs* refers to how a state views the utility of military power as an instrument for obtaining strategic goals; and *conditional factors* are different variables that shape, either positively or negatively, how a state can efficiently translate existing capabilities and resources into military power. Each block in turn consists of a number of more specific sub-components or variables. We call these "study factors." The overall framework, with its constitutive blocks and associated study factors, is presented in Table 2.1.

It is important to note that each study factor can also consist of one or more sub-components or variables that largely represent different aspects of a specific study factor. For instance, the study factor *military equipment* can include several variables such as not only conventional force capabilities (army, air force and navy) but also strategic assets, such as nuclear weapons arsenals or cyber and space capabilities.

The three constitutive blocks should be viewed as interrelated and considered in their totality when assessing a country's military power. The blocks and associated study factors aim to provide a deeper understanding of how they are related to military power, but without establishing direct causality between independent (cause) and dependent (effect/outcome) variables. Related to this, we do not rank any of the study factors or claim that any of them matter more than others on a generic level; however, when considering specific cases (i.e. countries, and in our case, China in subsequent studies), some study factors may potentially be more critical than others. It is furthermore important to note that some of the study factors may potentially be placed in more than one constitutive block. For instance, the study factor *defence industry and technology* is both an available material resource and a shaping condition. *Strategy* or *doctrine* may refer not only to perceptual inputs but also to conditional factors. For analytical purposes, however, we place study factors such as these within a given constitutive block. On the other hand, this does not mean that the placement of overlapping study factors will be made without a discussion of the rationale when appropriate.

The analytical framework takes into account some of the study factors most commonly used in the existing literature. It does not rule out, however, that there are additional factors that are not included in the framework. This is particularly valid for the block we call *conditional factors*, which theoretically can include a vast number of study factors. Moreover, some of the study factors constitute large research fields in their own right (as partly alluded to above), including a variety of different subcomponents and

variables. This relates, for example, to the *governance* or *alliance* study factors.

There is a valid argument for claiming that the block we call *perceptual inputs* could itself be viewed either as a conditional factor or as several individual study factors rather than a constitutive block in its own right. This is because the block broadly refers to "cognitive aspects and dimensions," such as perceptions, and more specifically, threat assessments, belief systems, and world views, which can function as incorporated elements of the broader notion of strategic culture, or of the somewhat narrower literature on strategy and doctrine. However, we claim that cognitive and perceptual factors remain somewhat underappreciated and have not been systematically explored in the literature in terms of how they connect to the study of military power. We therefore aim to explore this shortcoming in a more systematic manner. For our purposes, categorising these factors as a distinct building block is both conceptually and analytically appropriate.

The strength of the framework, as we see it, is that existing study factors can be particularly emphasised and developed or reconsidered as our research develops, or that new study factors can be added should new research or real-life events emerge and develop. In other words, the framework is open-ended and adjustable but contains some basic-set fundaments. The framework, furthermore, can be adjusted to fit specific countries, where some study factors may be more relevant to analyse than others. This is in line with the ambition to design a generic framework that can serve as an approach to assessing a country's overall military power, and which can then be used as a platform for more detailed analysis of specific dimensions, aspects, or factors of any given state's military power.

Resources

The first constitutive block refers to military and other related material resources available to a state. These correspond directly to what is described above and in the literature as the power-as-resource approach—that is, power as resources equated with existing material capabilities.

As also noted above, several such study factors are present in the broader literature on power, while also having direct or indirect effects on the understanding of military power. At the most basic level, macro factors such as natural resource availability, economic development, and growth all matter. In particular, the level of industrial capability, technological advancement, and innovation is important, as these elements provide a state, if it so chooses, with the crucial resource base that can be translated into potential military power. In terms of a more narrowly defined relation to military power, however, the following study factors can be considered.

Economy and Military Expenditure

Economic development and the level of sophistication and capacity for innovation matter as a basic fundament of any creation of national power, including military power.[86] Any initial analysis of a country's material capability and potential future ability needs to factor in the general development and trajectory of its economy, most commonly measured by GDP and economic growth. Other useful indicators may be demography, labour markets, welfare systems and standard of living, and economic policies, to name a few.[87]

Pertaining more directly to the military dimension, military expenditure commonly refers to the amount of financial resources a state will allocate to defence and defence-related items, and thus functions as an central prerequisite for building material military capabilities. It is also one of the most commonly used variables when assessing the relative military strength of states.[88]

Defence spending also reveals the priorities a state ascribes to it over other national priorities and is typically measured as a percentage of GDP relative to the overall economy. For more fine-grained analysis (if such data is available), assessments of how spending is allocated across different service arms or functional domains, as well as softer items such as education and management, can be helpful in understanding a state's military power and priorities.[89]

Military personnel

The size and composition of a country's military personnel functions, like military expenditure, as a crude but nonetheless relevant indicator of a country's military strength. At the most basic level, the total quantity of manpower does matter in most combat contingencies. Assessments of military personnel can include data on overall manpower size, as well as disaggregated figures for different service arms, numbers in the active

86 See, for instance, Gilpin. *War and Change*; Kennedy, *The Rise and Fall*. For more on specifically military power, see Beckley. Economic development.

87 Westerlund & Oxenstierna. *Russian Military Capabilities*.

88 Per Olsson. Measuring Quality of Military Equipment. *Defense and Peace Economics* Vol. 33, no. 1 (2022): pp. 93–107.

89 Tellis et al. *Measuring National Power*, pp. 136–138.

force and reserves, and additional data points such as age, gender, educational background, and ethnicity.[90]

Assessments may also include the quality of service members, in terms of education level, training, and operational skills in highly complex environments. Proficiency in joint operations, officer management, and command and control all are increasingly important factors to consider.[91]

Military equipment

The quantity of military equipment provides an inventory of a state's available weapons systems and supporting capabilities. These constitute the basic material assets used in military conflict and war. In practice, such an inventory involves listing weapons systems and equipment across all military branches, not only the army, navy, and air force, but also nuclear weapons and newer domains such as cyber, space, and electronic warfare. However, the actual composition of military assets will, of course, depend on the assigned task or military operation they are intended to perform. Even so, the collection of quantitative data on militaries remains a common endeavour for the intelligence community and military analysts. Some of these capabilities, cyber, for instance, are difficult to assess, although their importance for modern warfare makes them a key area of study. An additional task often performed involves not only detailing the types and quantity of military equipment but also assessing its quality.[92]

Military infrastructure and logistics

Military infrastructure refers to buildings, facilities, and installations that support and provide the necessary infrastructure and logistical network (both at home and abroad) for military missions and operations. This can include dedicated physical, military infrastructure such as military bases, airfields, and naval ports as well as related assets such as roads and railways, medical facilities, training ranges, and shelters. It also encompasses a hardened infrastructure to protect critical assets, including command, control and communication systems, strategic resource reserves (such as oil and food), and munitions production facilities.[93]

Defence industry and technology

A nation's defence industrial base constitutes the last study factor highlighted here. This aspect refers to industries and firms that the state's military depends on for the production of not only military equipment and weapons, including technology and supporting items and products, but also ability to shift to a wartime production in protracted conflicts and wars. This also points to the importance of guaranteeing secure access to key components and equipment by having a strong home production and reducing reliance on overseas imports.

In practice, a country's defence industry contains a broad spectrum of different functions that affects material military output and performance. These include, for instance, manufacturing capability to produce various major weapons systems, munitions, and communication systems; the degree and sophistication of indigenous innovation; research and development; international arms-technology cooperation and arms sales; as well as other supporting materials and the manufacturing of dual-use components such as microchips or semiconductors.

Broadly speaking, it is becoming increasingly important for states that their military capabilities comprise systems that integrate their defence industry with advances in civilian science and technology. A strong industrial base implies that a nation is able to pursue its interests independently of others. In terms of national defence, a dependence on foreign producers for arms supply can critically impede a nation's (or a coalition of nations') ability to impose its will on, and resist military coercion by, other states. Moreover, levels of advancement and innovation in emerging and critical technologies, many with dual-use functions, are becoming an increasingly important feature of national defence industries, with potentially significant implications for a state's ability to fight and prevail in future warfare.

90 Military strength can also be derived from paramilitary forces. In the case of China, this includes the People's Armed Police (PAP), Chinese Coast Guard, and various militias such as the Maritime Militia.

91 Tellis et al. *Measuring National Power*, p. 138. Factors and conditions such as these can, however, also be separated from the purely numeric measurement of military personnel and function as more fine-grained aspects and issues to study and assess. Indeed, in our framework, this is done precisely in order to include issues such as training, soldier education, and competence, for instance, in the constitutive block of conditional factors.

92 See, for instance, Per Olsson, Measuring quality.

93 Tellis et al. *Measuring National Power*, pp. 138–139.

Perceptual inputs

The second constitutive building block refers to what we label perceptual inputs. This refers to the basic underlying conceptualisation and cognitive frames a state holds, writ large, regarding the international security environment and perceptions of security threats, both internal and external, and which can then translate into foreign and security policies, military included.[94] For our purposes, we are especially interested in what informs the state's understanding of the function and role that military power should and can play in order to guarantee the security and survival of the state, as well as serve as a means to achieve broader and higher-end strategic goals and aims.

Some of the study factors run the risk of overlap, for instance, assessments of the international security environment and threat perceptions. Analytically, though, it makes sense to keep these separate so as to gain more structured understanding for the specific issue of perceptual and cognitive inputs. Moreover, aspects such as strategy and doctrine reflect to a certain degree a state's conceptualisation and thinking about military power and the use of force, in other words, what we claim to be perceptual inputs. We have opted, however, to place these in the third constitutive block (conditional factors), partly because they reflect more fine-grained accounts of how to think about military force (especially doctrine) and partly because we argue that they can be better viewed as conditional factors.

Unlike the other two building blocks, the block of perceptual inputs contains fewer of the clearly defined subcomponents and variables found in the existing literature. Nonetheless, drawing on various notions and approaches that emphasise perceptual and cognitive perspectives, we have sought to devise a number of useful study factors for our purposes.

Assessments of the international security environment

The nature and estimates of threat perceptions may function as useful indicators for understanding how states view the use of military force.[95] How a state assesses the overall nature, features, and dynamics of the international security environment will have a major impact on how it views its own position in the international system and also shape its threat perceptions of other states.[96] If the external environment is perceived as hostile, the likelihood is that a state will adopt policies and measures, including military ones, to ensure its security and national interests.

Perceptions of other states and the military balance

Perceptions and images of other nations' political systems or strategic culture can also be a useful indicator of how a state views the use of military force.[97] Perceptions of the military balance between a given state and other major powers, especially potential adversaries, have long served as another valuable indicator when evaluating how a state might conceive of its military power.[98] For instance, states engaged in strategic competition, such as the US and the Soviet Union during the Cold War, or the contemporary relationship between the US and China, can reveal overall assessments that in turn inform more concrete strategies, priorities, and defence planning in relation to a potential adversary (or several). This is not to say that one should carry out a net assessment analysis, but rather to conduct a broad examination of how a state views a particular military balance relationship, which can thereby reveal how the state conceives its own strengths and weaknesses.[99] For more fine-grained insights, analysis can also attempt to unpack thinking on specific service arms (for example the navy), operational domains such as cyber, or geographical areas and conflict scenarios.[100]

94 Judith Goldstein and Robert O. Keohane. Ideas and Foreign Policy. An analytical framework. In Judith Goldstein and Robert O. Keohane (eds.) *Ideas and Foreign Policy: Beliefs, Institutions, and Political Change* (New York: Cornell University Press, 1993), pp. 3–30.

95 For an overview of perceptions in the study of international relations, see Janie Gross Stein. Threat perception in International Relations. In Leonie Huddy, David O. Sears and Jack S. Levy (eds.). *The Oxford Handbook of Political Psychology* (New York: Oxford University Press, 2013); Jervis. *Perceptions and Misperceptions*.

96 Stephen M. Walt. *The Origins of Alliances* (Ithaca: Cornell University Press, 1987).

97 Andrew Scobell. *China and Strategic Culture* (Carlisle Strategic Studies Institute, U.S. Army War College, 2002).

98 Edward N. Luttwak. Perceptions of military force and US defence policy. *Survival* Volume 19, issue 1 (1977): pp. 2–8.

99 For a comprehensive study in this vein, see Mark Cozard, Jeffrey Engstrom, Scott W. Harold, Timothy R. Heath, Sale Lilly, Edmund J. Burke, Julia Brackup and Derek Grossman. *Gaining Victory in System Warfare. China's Perspective on the U.S.–China Military Balance.* Research report (Santa Monica: Rand Corporation, 2023).

100 That said, the more fine-grained approaches, as we argue, are better suited as part of strategy and doctrine in the block of conditional factors.

Perceptions of internal domestic context

Conceptualisations of what constitutes security challenges and threats are often not only external, but also internal and domestic. How the political leadership and elites view and asses the domestic political context, and what economic and societal challenges exist, affects national security policies, and also notions of military force. In this sense, any threat that a given state perceives as endangering its territory and sovereignty, political system, or national interests will be emphasised.

Threat perceptions constitute a highly subjective assessment from the viewpoint of the state in question and can therefore include domestic political, ideological, social, and economic threats, beyond purely military ones. How a state, and more specifically its political leadership, perceives the mix and balance of internal and external threats, and how this affects conceptualisations of national security challenges and issues—and, in turn, prioritisation, resource allocation, and policy—are central underlying perceptual inputs that are important to consider.

Conditional factors

The third constitutive building block comprises of what we call conditional factors. This refers to different study factors that directly or indirectly shape and influence a state's ability to translate available material resources into potential military capabilities and, ultimately, into efficient warfighting performance. In this sense, this set of study factors reflects the above discussion on power conversion, that is, factors or variables that affect the efficient utilisation of material power resources. It should be stressed, however, that many of these variables may also have the opposite effect, namely, to impede or constrain a state's ability to make use of its resources. For instance, proper training and highly skilled, well-educated officers and soldiers may enhance warfighting capabilities, whereas a lack of training may hinder an army's performance in combat. It should also be noted that some conditional factors, such as geography or polarity, have less to do with the efficient utilisation of power resources per se and function more as structural factors or circumstances that broadly shape a state's strategic space to pursue, or refrain from pursuing, certain policies.

Geography and structure of the international system

The geographical location and physical environment shape a state's security conditions and thus influence the type of military capabilities and force structure that are most appropriate. Geographical proximity affects threat perceptions.[101] For instance, a landlocked country tends to develops more land-based capabilities, while coastal states place greater emphasis naval forces. In addition, geographical proximity to other states matters. Short distances and open terrain between two states (especially if they are adversaries) affect force postures, logistics, and key aspects of warfighting. Conversely, difficult terrain, such as mountains, or long distances, such as those across oceans, make it more difficult to conduct offensive operations, for instance. Political geography also plays a role; for example, being surrounded by countries with opposing political systems, territorial disputes, or failed states can also significantly shape a state's security considerations.

The structure of the international system, moreover, affects state behaviour, including strategy and the use of military forces.[102] It is often described as multipolar, bipolar, or unipolar. The "poles" in the system comprise the most powerful states, commonly referred to as "great powers."[103] Depending on the system's polarity, i.e. the number of poles (great powers), there are different effects on interstate behaviour, particularly on matters of war and peace, and thus on the overall stability of international relations. For instance, international politics is considered more stable under bipolarity than under multipolarity. Although studies of system polarity often focus on great-power interaction, the type of international system also affects smaller states.[104]

Governance

Governance matters for how a state's resources and military capabilities are created and utilised efficiently. Governance broadly refers to a government's ability to make and enforce rules and to deliver services to its populations, regardless of regime type (i.e. democratic or authoritarian).[105] As such, it places emphasis on

101 Walt. *The Origins of Alliances*.

102 Nina Græger, Bertel Heurlin, Ole Wæver & Anders Wivel (eds.). *Polarity in International Relations. Past, Present, Future* (Cham: Palgrave MacMillan, 2022).

103 Waltz. *Theory of International Politics*, p. 131. Waltz for instance, defines a pole as having large resources on the following indicators: (1) size of population and territory, (2) natural resources, (3) economic development, (4) military strength, and (5) political competence.

104 Anders Wivel. The Grand Strategies of Small States. In I. T. Balzacq and R. R. Krebs (eds.). *The Oxford Handbook of Grand Strategy* (New York: Oxford University Press, 2021), pp. 490–505.

105 Francis Fukuyama. What Is Governance? *CGD Working Paper* 314 (Washington, DC: Center for Global Development, 2013).

institutions and the set of rules and procedures governing collective behaviour. A more fine-grained operationalisation is provided by the World Bank, which divides governance into six dimensions: voice and accountability, political stability and absence of violence/terrorism, government effectiveness, regulatory quality, rule of law, and control of corruption.[106] In this sense, governance is similar to, but not the same as, related concepts such as state capacity, as it entails a broader conceptualisation.

The inclusion of governance as a factor does not imply that all of its aspects or dimensions need to be studied; rather, the purpose is to provide a menu of potentially relevant factors or issues that may have a direct or indirect bearing on military power. This can include issues such as military organisation, bureaucratic decision-making, and implementation processes, both more broadly within government institutions and more specifically within military bodies.[107]

The large body of literature on military power and efficiency that focuses on civil-military relations, and which directly relates to issues of governance, can be particularly relevant.[108] Civil-military relations concern how, and to what extent, civilian leaders and institutions should delegate power and authority to military leaders and the armed forces in matters of war and peace, while at the same time ensuring that the military remains under civilian control.[109]

Research on civil-military relations can also focus more broadly on what mechanisms and processes exist for managing differences and disputes between the state and civil society, as well as the impact this has on policy formulation and implementation in military affairs.[110] Civil-military relations can reflect different types of political systems and regime types, and thus vary in their political and institutional setup, affecting military power and, ultimately, warfighting potential. For the purpose of the study on China's military power, research concerning military performance and efficiency in autocratic regimes can be particularly useful.[111] That said, there is still an ongoing debate regarding regime type (for instance, between democracies and autocracies) and its effects on military capabilities and effectiveness.[112]

Strategy, doctrine, and operational concepts

The importance of strategy, doctrine, and operational concepts for military effectiveness has been explored in a number of studies.[113] Simply put, ineffective or contradictory strategies and doctrines can negate the military advantages of even a militarily powerful state and, conversely, enable the effective performance of military assets in conducting a given military operation or campaign.[114]

Military doctrine can be conceptualised as a set of basic guidelines and principles for how best to use available military capabilities and assets in conducting a military task. This includes the planning and organisation of the type of forces relied on and how these should be deployed, depending on the missions and operations, as well as the modes of integration and cooperation between forces. This also includes ideas and views about modern and future warfare, particularly ideas about military conflict, war and peace, escalation, and the use of force, including the use of force as threat, cohesion, and deterrent. It should be noted that military doctrine is often viewed as a "subcomponent" of national or grand strategy.[115]

106 World Bank. Worldwide Governance Indicators., *https://www.worldbank.org/en/publication/worldwide-governance-indicators.* Examples of how these indicators connect to military power are provided in Chapter 4.

107 This broadly relates to the well-established research program called "bureaucratic politics." The classic study here is Graham Allison. *The Essence of Decision: Explaining the Cuban Missile Crisis* (Boston: Little Brown, 1971). Some of these, for instance, military organisation, or, more specifically, military effectiveness, can be analysed as more isolated study factors, which we also do. See below for more details.

108 For a broad overview of the civil–military research program, see, for instance, Aurel Croissant, David Kuehn and David Pion-Berlin (eds.). *Hardback Research Handbook on Civil–Military Relations* (Northampton: Edward Elgar Publishing, 2024).

109 Risa S. Brooks. Civil–Military Relations and Military Effectiveness: Egypt in the 1967 and 1973 Wars. *Creating Military Power. The Sources of Military Effectiveness*. In Risa S. Brooks and Elizabeth A. Stanley (eds), (Stanford: Stanford University Press, 2007), p. 106.

110 Ripsman et al. *Neoclassical Realist Theory*, pp. 70–71.

111 Caitlin Talmadge. *The Dictator's Army: Battlefield Effectiveness in Authoritarian Regimes* (New York: Cornell University Press: 2015).

112 Tellis et al. *Measuring National Power*, pp. 147–148.

113 See Biddle. *Military Power.*

114 We leave out grand strategy as a directly specified study factor in this block. The concept of grand strategy is contested and lacks clarity regarding what it means and how it is best studied. That said, it can be claimed that, as a basic starting point, grand strategy refers to how a country seeks to turn its vision and goals for the future into actions. We thus include grand strategy in our framework, but do so elsewhere and partly "disintegrated." For instance, we deal with grand strategy in the block on perceptual inputs, in the way threat perceptions inform leaders' visions or goals for their country's long-term development. In this block, on conditional factors, we look at military doctrine as a subcomponent of grand strategy. For a useful overview of the grand-strategy debate in the literature, see, for instance, Nina Silove. Beyond the Buzzword: The Three Meanings of "Grand Strategy." *Security Studies* Volume 27, Issue 1 (2018): pp. 27–57.

115 See Barry R. Posen. *The Sources of Military Doctrine. France, Britain, and Germany Between the World Wars* (New York: Cornell University Press, 1986).

Theorising and conceptualising the planning and implementation of military doctrine varies among different countries and is a function of different historical, cultural, social, and political traditions, legacies and circumstances. The notion of operational concepts is often used synonymously with doctrine but can be viewed as a more fine-grained process of planning, development, and employment for more specific missions, weapons platforms, or operational and integrated conduct that follows the overarching guidelines and principles formulated as military doctrine. Moreover, operational concepts often include plans and development for how states plan and aim to tackle future challenges and wars.[116] At the same time, they do not address lower-level conceptualisation of battlefield conduct on the tactical level.

Organisational effectiveness and training

It is important to study questions concerning the form of control and command structures (whether decision-making is highly centralised or decentralised, for example), the level of flexibility and agility required to adapt to changing conditions, and the ability for integration, particularly the extent of jointness across military forces and operations.[117] For instance, in the case of China, there is growing attention to these types of issues (see further in Chapter 3).

Moreover, military forces are ultimately made up of human resources. Issues such as soldier motivation and the will to fight, the quality and competence of military leaders and officers, and questions regarding corruption all impact military effectiveness. Any army that is not properly trained will not be able to make effective use of the material assets at its disposal. Well-trained and educated soldiers and officers are better equipped to optimise sophisticated weaponry and to perform complex and challenging tasks and missions. An oft-cited example is how poor performance of the Iraqi army in the Gulf War, despite its access to relatively advanced and sophisticated weaponry.[118] In the case of Russia's ongoing war against Ukraine, for instance, some have pointed out that an important reason for Russia's poor battlefield performance has been the low level of military professionalism at the individual soldier level, coupled with an inability to scale up its military forces through mobilisation. So, despite decades of military reform in Russia, including military technological modernisation, the role of the individual soldier has been neglected.[119] Finally, combat experience can also serve as a crucial factor, particularly for militaries that lack recent large-scale war experience, such as, for instance, China.[120]

Alliances and strategic partnerships

Defence cooperation and especially formal alliance formation may have an impact on a state's military power. Alliance formation with other states can aggregate a state's military capabilities and defence planning, including joint control, command, operations, and overseas basing.

Beyond formal alliances, states can use other less formalised arrangements to enhance their military capabilities. For instance, different types of military-strategic partnerships, which may include arms sales, joint military exercises, joint military-industrial production, or other forms of defence and military cooperation, can bolster both the material resource base (for instance, acquisition of new weaponry) and military expertise and competence through various forms of military-to-military cooperation through training. More broadly, military diplomacy may help to enhance defence cooperation with other states and build cordial relations with other militaries, thereby shaping the external environment to be more benign and friendly for the state.[121]

It should, however, be pointed out that alliances may also have adverse effects on states. This can happen, for instance, when a state is dragged into a military conflict or war by another state in the alliance and, due to alliance commitments, needs to support that state, a situation referred to as "entanglement".[122] This is regardless of whether the conflict actually threatens or challenges its own vital national security interests. Conversely, states can be subjected to "abandonment". This refers to fears of an allied state (or states) leaving the alliance or failing to living up to the formal commitments of the alliance, most notably military help and support.

116 Paul Benfield and Greg Grant. *Improving Joint Operational Concept Development within the U.S. Department of Defense*. (Washington, DC: CNAS, 2021) *https://www.cnas.org/publications/reports/improving-joint-operational-concept*.

117 Mark Cozad, Maria McCollester, Jonathan Welch and Matthew Fay. *Rethinking Jointness? The Strategic Value of Jointness in Major Power Competition and Conflict* (Santa Monica: Rand Corporation, 2023).

118 Biddle. *Military Power*, pp. 1–2.

119 Jonas Kjellén, *Bringing the soldier back in—Russian military manning, manpower, and mobilisation in the light of Russia's war in Ukraine*. FOI-R--5461--SE (2023).

120 Timothy R. Heath. China's Untested Military Could Be a Force—Or a Flop. *Foreign Policy* (27 November 2018). *https://foreignpolicy.com/2018/11/27/chinas-untested-military-could-be-a-force-or-a-flop/*.

121 Wolfley. Military Statecraft.

122 Glenn H. Snyder. *Alliance Politics* (New York: Cornell University Press, 1997).

2.4 Recapitulating some key points of the analytical framework

We end this chapter by briefly recapitulating some key aspects of our review of the (military) power literature and, specifically, of our analytical framework.

First, we acknowledge that the literature on power and military power is vast and that there are several different perspectives and approaches available. As noted above, there is no clear consensus on the definition of power, let alone military power. To that end, we have adopted a rather broad working definition of military power based on existing conceptualisations in the literature but adjusted to our specific purpose in providing a generic and broad conceptual understanding of how to study military power.

Second, the framework is intended to enable an informed overall assessment of a state's strengths and weaknesses in terms of military power. It should be emphasised that our framework broadly fits within the power-as-resource approach discussed above. The framework does not aim to provide an actual estimate or measurement of military power with the ambition of being able to conduct country-to-country comparisons, akin to more explicit net assessment. Nor does the framework explicitly provide an analysis of specific military conflict contingencies or war scenarios.

Third, although we situate ourselves broadly in the power-as-resource approach, we have constructed a general analytical framework that provides a broad set of different variables and factors for how to study military power. As recalled, we constructed three broad analytical constitutive blocks: resources, perceptual inputs, and conditional factors, each of them consisting of a number of more specific study factors. We have especially emphasised what we refer to as perceptual inputs relating to how military power and its utility may be viewed by a particular state or political actor. We should also point out that the framework does not claim to account for all existing study factors, nor that we "rank" the study factors' importance or seek causal mechanisms. The question of which specific study factors should be studied, along with under what conditions (different types of conflict scenarios) and for which specific countries, thus remains flexible. In other words, the framework is constructed to remain open-ended and adjustable, while still containing a basic set of fundaments. In the end, the framework and the constitutive blocks (along with the more specific study factors) are best viewed as integrated. Perceived in a holistic way, these ultimately function as a totality assessment of a country's military power. ■

3. Previous research on China's military power outside China

Johan Englund

The purpose of this chapter is to provide an overview of some of the vast body of literature on research that has been conducted in areas concerning China's military power and the PLA.[123] The literature has mostly been produced by actors from governmental and military sectors, academia, and policy-oriented think tanks and research institutes, as well as independent security experts and journalists. A majority of the leading research stems from the US, while far fewer contributions come from Europe, Japan, Taiwan, Singapore, South Korea, India, and Australia. The research covers a wide range of topics and subtopics relevant to China's military development and power such as, *inter alia*, advances in China's military hardware and its forces' capabilities; the PLA's organisational structure and reforms, personnel and training, threat perceptions, strategies and doctrines; the Chinese defence industry; and force deployments and activities beyond China's borders.

The scope of this catalogue of literature on China's military power is too broad and deep to cover every aspect and theme in this overview. Instead, by reviewing selected works on key areas relevant to the overarching topic of China's military power, we aim to provide an initial understanding of the field's current state. It is important to note that this overview does not aspire to summarise the full spectrum of all the arguments and discussions in each research field, identify the gaps and trends across the literature, or evaluate the overall strengths and weaknesses of the PLA and China's military power in general. These are contributions to the understanding of China's military power that we will address gradually in our forthcoming studies on various topics related to China's military power. Occasionally, the overview does engage in evaluations and assessments of the military, but this is meant to serve as an introduction and insight into the literature rather than to undertake an independent evaluation of this vast research landscape.

This overview of previous research focuses on themes considered particularly relevant to influencing and shaping China's military power. It covers force structure and equipment, non-material factors and related issues, and overseas defence operations and relations, as well as military strategy and doctrine. While other factors also affect the total picture of China's military power, the identified themes are judged to be among the most prominent in shaping its military capabilities and power, and are among the most frequently discussed in the literature These overarching themes also intersect with the three broad analytical blocks that comprise our analytical framework: resources, perceptual inputs, and conditional factors (see Chapter 2). They are therefore partial reflections of factors that can be categorised into one or more of these blocks.

3.1 China's military force structure and equipment

Assessing China's military power involves an essential issue identified in the literature and pertaining to analysis of the PLA's military forces and capabilities. The dimensions of such factors as its military equipment and defence industrial capacity are important factors in analysing China's resource availabilities, which constitutes one of the three blocks in our analytical framework. As such, a significant part of the literature on China's military power devotes attention to this area. In the literature, a good start is the widely-cited official reports from the U.S. administrations, such as the Defense Intelligence Agency (DIA) report on China's military power from 2019 and the annual reports by

123 For a review of earlier works on the PLA, see, for example: Mattis. A*nalyzing the Chinese Military;* American Mandarin Society. S*elf-Study Syllabus on the Chinese People's Liberation Army* (2019); Ian Burns McCaslin and Andrew S. Erickson. T*he People's Liberation Army (PLA)* (Oxford: Oxford University Press, 2005).

the Department of Defense (DoD) on "Military and security developments involving the People's Republic of China."[124] These reports detail Chinese efforts to build a modernised military force by analysing and estimating military and security developments in the PRC over the previous year. They also contain a wide array of other sections concerning China's military, such as Chinese strategies for pursuing military modernisation and national goals, the PRC's threat assessments, and the PLA:s growing global presence. Adding to these American official reports, the British think tank The International Institute for Strategic Studies (IISS) also contributes to the literature on China's military force structure and equipment through its annual publication *The Military Balance*, which provides an open-source assessment of the armed forces and its equipment.[125] Beyond these three broadly "institutional" and much referred-to publications, there is also a myriad of important research from scholars and analysts that bring important insights to the analysis of China's military forces and capabilities. Many of these contributions are referred to in the overview that follows below.

A common feature in the literature is the recognition of the PLA's significant advancements in capabilities over the past decades. Having viewed the PLA as holding relatively limited and backward military capabilities in the 1990s, scholars and institutes have described how the PLA has expanded and modernised rapidly over the years.[126] Importantly, it is not only noted that the PLA has enhanced its military power considerably and is now deemed to possess significant hardware capabilities, but also that the PLA is expected to strengthen its operational skills and power projection going forward. As the DIA report from 2019 points out, the PLA is now a military that fields extensive capabilities in its near region and increasingly beyond its borders.[127] It has made substantial improvements in developing the required capabilities for conducting joint operations under "informatized" conditions,[128] and it is likely to become more technologically skilled with advanced fighter jets, naval vessels, and missile systems that support China's military goals, both in its near region and farther afield.[129] Coupled with this, there is indeed also literature that explicitly discusses and tries to estimate China's future military posture and capabilities, even though much of the literature in general briefly touches on this as well.[130] A related area concerns the PLA's development of capabilities in areas such as nuclear, space, and cyberspace that can threaten opponents across the globe. For example, Roger Cliff notes that if the current trajectory persists, within a decade the PLA might hold a nuclear force comparable to that of the US and Russia.[131] The DoD is less explicit in its assessment but estimates the PLA's nuclear forces will continue to grow "to 2035 in line with its goal of ensuring PLA modernization is 'basically complete' that year, an important milestone on the road to Xi's goal of a 'world class' military by 2049."[132] Nonetheless, by analysing the capabilities the PLA seeks to acquire in the future, Cliff finds that China aims to be dominant in a wide range

124 Defense Intelligence Agency. C*hina Military Power—Modernizing a force to fight and win* (2019); U.S. Department of Defense. M*ilitary and Security Developments Involving the People's Republic of China 2022.* Annual Report to Congress (2023).

125 International Institute for Strategic Studies. T*he Military Balance 2024* (London: Routledge, 2024).

126 See, for example, Andrew Scobell. Chinese Army Building in the Era of Jiang Zemin. M*onographs* 133 (2000); Bates Gill. Chinese Military-Technical Development: The Record for Western Assessments, 1979–1999. In James C. Mulvenon and Andrew N. D. Yang (eds.). S*eeking Truth from Facts: A Retrospective on Chinese Military Studies in the Post-Mao Era* (Santa Monica: RAND Corporation, 2001), pp. 141–171; James C. Mulveon and Andrew N. D. Yang (eds.). T*he People's Liberation Army as Organization: Reference* (Santa Monica: RAND Corporation, 2002); Evan S. Medeiros, Roger Cliff, Keith Crane, and James C. Mulvenon. A *New Direction for China's Defense Industry* (Santa Monica: RAND Corporation, 2005); Defense Intelligence Agency. *China Military Power – Modernizing a force to fight and win;* U.S. Department of Defense, M*ilitary and Security Developments (*2023); Roger Cliff. C*hina's Military Power: Assessing Current and Future Capabilities* (New York: Cambridge University Press, 2015); Roger Cliff. C*hina's Future Military Capabilities* (Carlisle: USAWC Press, 2023).

127 Defense Intelligence Agency. *China Military Power – Modernizing a force to fight and win.*

128 In the report from the Defense Intelligence Agency, the term "informatized warfare" is referred to as the PLA's way to "describe the process of acquiring, transmitting, processing, and using information to conduct joint military operations across the domains of land, sea, air, space, cyberspace, and the electromagnetic spectrum during a conflict." See Defense Intelligence Agency. *China Military Power – Modernizing a force to fight and win,* p. 24.

129 Defense Intelligence Agency. *China Military Power;* U.S. Department of Defense, M*ilitary and Security Developments (*2023); Cliff. C*hina's Future Military Capabilities.*

130 See for example: Lonnie D. Henley. Whither China? Alternative Military Futures, 2020–2030. In Roy Kamphausen and David Lai (eds.). T*he Chinese People's Liberation Army in 2025* (Carlisle: Strategic Studies Institute, 2014), pp. 31–54; Ross Babbage, Jack Bianchi, Julian Snelder, Toshi Yoshihara, Aaron Friedberg, and Nadège Rolland. W*hich Way the Dragon? Sharpening Allied Perceptions of China's Strategic Trajectory* (Washington, DC: Center for Strategic & Budgetary Assessments, 2020)*;* Cliff. C*hina's Future Military Capabilities;* U.S. Department of Defense, M*ilitary and Security Developments (*2023); Ronald O'Rourke. C*hina Naval Modernization: Implications for U.S. Navy Capabilities—Background and Issues for Congress* (Washington, DC: Congressional Research Service, 30 January 2024).

131 Cliff. C*hina's Future Military Capabilities.*

132 U.S. Department of Defense, M*ilitary and Security Developments (*2023), p. 104

of capabilities, including sea, air, ground, space, and cyber. Moreover, as the DoD asserts, the PLA continues to strengthen its ability to "fight and win wars," counter adversaries intervening in its near periphery, and project power on the global stage.[133]

Of course, there is also literature highlighting weaknesses in China's military.[134] These include areas such as the force's warfighting and command capabilities, as well as its abilities to conduct joint operations, resupply missions, and anti-submarine warfare. But predetermined or structural factors are also discussed, such as China's challenging geography and disadvantageous demographic trajectory, its lack of major allies in the world, and uncertainties regarding its economic and technological progress.

PLA capabilities in different services

Studies of the PLA's growing capabilities extend into its individual services. The literature devotes considerable attention to the expansion and improvements that have taken place within the PLA's various forces. All of them are considered to have been strengthened considerably, albeit to varying degrees. For example, whereas the navy has seen significant investments and progress, the army has not received the same level of prioritisation.

Given its notable naval advancements, the People's Liberation Army Navy (PLAN), in particular, has attracted much attention.[135] The PLAN has become the world's numerically largest navy. Largely composed of modern multi-mission ships, it is deemed by many to be a "formidable military force within China's near-seas region" that in many respects is comparable to that of the American navy.[136] Moreover, as Beijing prioritises naval capabilities as an essential component in its military modernisation, China is expected by some to sustain its growth and transform the navy into a technologically advanced force.[137]

There is also an important notion that China's naval improvements reflect the country's strategy to shift from a "near-seas active-defence" strategy to a "near seas defence and far seas protection" strategy, which aims to become a maritime power with a modern and global naval force able to conduct both different peacekeeping missions and high-intensity combat operations.[138] As such, much of the literature notes that as the PLAN modernises, it is becoming increasingly capable of conducting operations in waters further away from its borders. DoD underscores that the PLAN in the near-term

133 U.S. Department of Defense, M*ilitary and Security Developments (*2023).

134 See, for example, Michael S. Chase, Jeffrey Engstrom, Tai Ming Cheung, Kristen Gunness, Scott W. Harold, Susan Puska, and Samuel K. Berkowitz. C*hina's Incomplete Military Transformation: Assessing the Weaknesses of the People's Liberation Army (PLA)* (Santa Monica: RAND Corporation, 2015); Dennis J. Blasko. P*LA Weaknesses and Xi's Concerns about PLA Capabilities.* Testimony before the U.S.–China Economic and Security Review Commission Panel on "Backlash from Abroad: The Limits of Beijing's Power to Shape its External Environment" (The U.S.–China Economic and Security Review Commission, 7 February 2019); Babbage et al. W*hich Way the Dragon? Sharpening Allied Perceptions of China's Strategic Trajectory;* Cliff. C*hina's Future Military Capabilities;* U.S. Department of Defense. M*ilitary and Security Developments (*2023); O'Rourke. C*hina Naval Modernization: Implications for U.S. Navy Capabilities—Background and Issues for Congress;* Cozad et al. G*aining Victory in Systems Warfare: China's Perspective on the U.S.-China Military Balance* (Santa Monica: RAND Corporation, 2023).

135 See, for example, Bernard D. Cole. T*he Great Wall at Sea: China's Navy in the Twenty-First Century,* 2nd ed. (Annapolis: Naval Institute Press, 2010); Phillip C. Saunders, Christopher D. Yung, Michael Swaine, and Andrew Nien-Dzu Yang (eds.) T*he Chinese Navy: Expanding Capabilities, Evolving Roles* (Washington, DC:National Defense University Press, 2011); Andrew S. Erickson and Ryan D. Martinson (eds.). C*hina's Maritime Gray Zone Operations* (Annapolis: Naval Institute Press, 2019); Michael McDevitt. C*hina as a Twenty-First-Century Naval Power: Theory, Practice, and Implications* (Annapolis: Naval Institute Press, 2020); O'Rourke. C*hina Naval Modernization: Implications for U.S. Navy Capabilities—Background and Issues for Congress.*

136 O'Rourke. C*hina Naval Modernization: Implications for U.S. Navy Capabilities—Background and Issues for Congress.* But also see, for example, U.S. Department of Defense, M*ilitary and Security Developments (*2023); James E. Fanell. "Asia Rising: China's Global Naval Strategy and Expanding Force Structure", N*aval War College Review* Vol. 72:1 (2019); David C. Logan. C*hina Maritime Report No. 33: China's Sea-Based Nuclear Deterrent: Organizational, Operational, and Strategic Implications* (Newport, RI: US Naval War College, 2023); Alexander Palmer, Henry H. Carroll, and Nicholas Velazquez. U*npacking China's Naval Buildup* (Washington, DC:Center for Strategic & International Studies, 5 June 2024).

137 Fanell. Asia Rising: China 's Global Naval Strategy and Expanding Force Structure; Alexander Palmer, Carroll, and Velazquez. U*npacking China's Naval Buildup.*

138 Nan Li. The Southern Theater Command and China's Maritime Strategy. T*he Jamestown Foundation* Vol. 17:8 (9 September 2017); Jennifer Rice and Erik Robb. C*hina Maritime Report No. 13: The Origins of "Near Seas Defense and Far Seas Protection.*" (Newport, RI: US Naval War College; 2021); Emma Salisbury. C*hina's PLAN: Maritime dominion beyond the South China Sea* (Council on Geostrategy, 2024).

can undertake long-range precision strikes against land-targets from its surface vessels and submarines, which will significantly elevate China's capability to project power farther beyond its borders.[139] It contends that the navy's ability to conduct missions beyond the first-island chain is "modest but growing as it gains more experience operating in distant waters and acquires larger and more advanced platforms."[140] As a result, some analysts project that the PLAN will become a more global navy that is increasingly capable of operating far from China, fielding highly capable multipurpose ships and maintaining a consistent presence of ships at sea, while also possessing a credible submarine-launched ballistic missile (SLBM) as well as sophisticated electronic and information warfare capability.[141] Furthermore, by operating six nuclear-powered ballistic missile submarines (SSBNs), the PRC now also holds a credible sea-based nuclear deterrent.[142] As for the PLAN's capabilities to operate "locally" in its near seas, it is broadly assessed to have made considerable improvements. Together with its coast guard and maritime militia, the PLAN has seemingly grown significantly capable of deterring third-party intervention in the Taiwan Strait or the South China Sea. Indeed, these are also deemed to be the PLAN's principal focus.[143]

That said, although China's naval buildup indicates strong advancements, the research also emphasises that weaknesses remain in the PLAN. Ronald O' Rourke, for example, points to limits in conducting joint operations, anti-submarine warfare, at-sea resupply missions, long-range targeting, and the limited numbers of overseas facilities, as well as challenges related to personnel-related competencies.[144] As such, the literature indicates that it remains to be seen to what extent the PLAN develops into a world-class navy, in particular with regards to its capabilities for operating far beyond its near region. An important challenge frequently mentioned in this context is China's lack of military bases around the world.

While the PLAN garners much attention due to its rapid modernisation, the People's Liberation Army (PLAA) receives comparatively less.[145] The PLAA is broadly considered to have declined in status relative to other services as a result of the PLA's overarching modernisation.[146] However, it is still making progress. Research indicates that, although the ground forces still use a mixture of old and modern equipment, they continue to modernise their equipment and expand new types of combat forces (e.g. long-range rockets and electronic warfare units) to meet the ambition of becoming a world-class military and contributing to the PRC's national goals.[147] For instance, the PLAA's amphibious forces are adopting new technological capabilities such as UAVs and robots to add new dimensions to a potential PLA assault on Taiwan.[148] If the PLA's objective to improve its army is realised, the future PLAA is expected to become more streamlined yet more capable of conducting multiple types of combat missions.[149]

The People's Liberation Army Air Force (PLAAF) and PLAN Aviation is together now the largest aviation force in the Indo-Pacific region. Although not making as dramatic progress as the PLAN, the PLAAF is nonetheless considered to be undergoing significant improvements in both quality and quantity, which has also garnered notable attention.[150] For instance, the American Air University's China Aerospace Studies Institute contends that Chinese military aerospace enterprises now produce engines approaching the standard of NATO

139 U.S. Department of Defense. M*ilitary and Security Developments (*2023).

140 Ibid., *p*.54.

141 Cliff. C*hina's Future Military Capabilities;* Fanell. Asia Rising: China's Global Naval Strategy and Expanding Force Structure.

142 U.S. Department of Defense. M*ilitary and Security Developments* (2023).

143 See, for example, Salisbury. C*hina's PLAN: Maritime dominion beyond the South China Sea;* U.S. Department of Defense. M*ilitary and Security Developments (*2023); O'Rourke. C*hina Naval Modernization: Implications for U.S. Navy Capabilities—Background and Issues for Congress.*

144 O'Rourke. C*hina Naval Modernization: Implications for U.S. Navy Capabilities—Background and Issues for Congress.*

145 For a comprehensive and detailed study of the PLA's ground forces, see Dennis J. Blasko. T*he Chinese Army Today: Tradition and Transformation for the 21st Century* (New York: Routledge, 2012).

146 Phillip C. Saunders and John Chen. I*s the Chinese Army the Real Winner in PLA Reforms?* JFQ 83, 4th Quarter (National Defense University Press, 2016); Dennis J. Blasko. The Biggest Loser in Chinese Military Reforms: The PLA Army. In Phillip C. Saunders, Arthur S. Ding, Andrew Scobell, Andrew N. D. Yang, and Joel Wuthnow (eds.), C*hairman Xi Remakes the PLA: Assessing Chinese Military Reforms* (National Defense University Press. 2019), pp. 345–392.

147 U.S. Department of Defense, M*ilitary and Security Developments (*2023); Dennis J. Blasko. The PLA army after 'below the neck' reforms: Contributing to China's joint warfighting, deterrence and MOOTW Posture. J*ournal of Strategic Studies* 44:2 (2019): pp 149–183.

148 Dennis J. Blasko. C*hina Maritime Report No. 20: The PLA Army Amphibious Force* (Newport, RI:US Naval War College, 2022).

149 Cliff. C*hina's Future Military Capabilities.*

150 See, for example, Kenneth W. Allen. T*he Ten Pillars of the People's Liberation Army Air Force: An Assessment* (The Jamestown Foundation, 2011); Kenneth W. Allen. C*urrent Overview of the PLA Air Force's Organizational Structure* (Center for Intelligence Research and Analysis, *29* August 2023).

nations, while the US DoD assesses that the PLAAF is catching up with Western air forces.[151] In late 2024, China carried out test flights of two sixth-generation fighter prototypes, indicating that China is making significant advances in modern military aviation. Thus, the PLAAF is also considerably improving its capabilities. Looking ahead, the direction in the literature points to a PLAAF with growing numbers of multirole fighters and bombers, while also undergoing greater integration with air and missile systems.[152]

Another service in the PLA attracting research interest is the People's Liberation Army Rocket Force (PLARF).[153] The rocket force has been a central part of the PLA's modernisation, having developed a significant capability. It possesses a large variety of conventional ground-launched cruise missiles (GLCMSs) and mobile ground-launched, short-, medium-, and intermediate-range ballistic missiles.[154] By fielding these capabilities, the PLARF complements the air and sea strike capabilities of the PLAAF and PLAN. The PLARF is improving its readiness for long-range strikes in the Indo-Pacific, as well as against the US. The DoD believes that China may be developing conventionally-armed intercontinental-range missile systems, which would potentially enable conventional strikes against Hawaii, Alaska, and the continental United States.[155]

China holds the world's largest missile programme of short and inter-mediate range conventional missiles and an increasingly sophisticated nuclear missile force. The PLARF is enhancing its strategic deterrence capabilities by expanding its nuclear stockpile and developing improved delivery systems, including new ICBMs that strengthens its nuclear-capable missile force. It is estimated that about a third of China's ballistic nuclear-capable missiles can strike the continental US.[156] However, expectations on Chinese current and future nuclear weapons arsenal differ, reflecting the lack of transparency in China's nuclear weapons programme. While the US Department of Defense estimates China to have more than 600 operational nuclear warheads and projects it to hold more than 1000 operational warheads by 2030, the Federation of American Scientists' Nuclear Information Project estimates the current stockpile to be approximately 500 warheads and will reach around 600 by 2030.[157] However, most research agrees that the PLARF's modernisation of its nuclear arsenal has expanded significantly in past years, as its nuclear-capable missile forces are becoming more survivable through improved delivery systems.[158] Thus, the literature views the PLARF as a crucial force within the PLA, not least in terms of nuclear weapons development and strategic deterrence. That said, other PLA services also hold nuclear roles. China is advancing its nuclear triad, which also consists of sea-based and air-based delivery systems. China currently operates six Type 094 (Jin-class) SSBNs, along with a small fleet of H-6N strategic bombers capable of delivering nuclear weapons.[159] In addition to expanding its nuclear arsenal both quantitatively and qualitatively, there is a growing academic and policy debate on potential changes to China's nuclear strategy. In short, there is intense discussion over whether China is revising its long-held conservative stance, viewing nuclear weapons as strictly for defensive and deterrence purposes, towards a posture that opens up more options for their use, such as for coercion or compellence, or even aiming for nuclear parity with the US and Russia.[160]

Lastly, a growing body of literature engages with China's capabilities in non-traditional military areas such as cyber, space, and emerging technologies that

151 Air University China Aerospace Studies Institute. P*LA Aerospace Power: A Primer on Trends in China's Military Air, Space, and Missile Forces.* 4th ed. (2024); U.S. Department of Defense. M*ilitary and Security Developments (*2023).

152 Cliff. C*hina's Future Military Capabilities.*

153 See, for example, Michael S. Chase. P*LA Rocket Force Modernization and China's Military Reforms* (RAND Corporation, 2018); U.S. Department of Defense, M*ilitary and Security Developments (*2023).

154 U.S. Department of Defense. M*ilitary and Security Developments (*2023).

155 Ibid.

156 Hans M. Kristensen, Matt Korda, and Eliana Reynolds. Chinese Nuclear Weapons: 2023. B*ulletin of the Atomic Scientists* 79, no. 2 (2023), p. 115.

157 U.S. Department of Defense, *Military and Security Developments Involving the People's Republic of China 2024. A*nnual Report to Congress (2024); Hans M. Kristensen, Matt Korda, Eliana Johns and Mackenzie Knight. Chinese nuclear weapons 2024. B*ulletin of the Atomic Scientists* Vol. 80:1 (2024): pp. 49–72.

158 U.S. Department of Defense. *Military and Security Developments (*2023), pp. 66–69; Kristensen, et al. Chinese nuclear weapons 2024: Air University China aerospace studies institute. *PLA Aerospace power: A Primer on Trends in China's Military Air, Space, and Missile Forces.*

159 See, for instance, U.S. Department of Defense. *Military and Security Developments (*2024).

160 For an overview of different perspectives on how to interpret China's nuclear buildup, see David C. Logan and Phillip C. Saunders. Discerning the Drivers of China's Nuclear Force Development: Models, Indicators, and Data. *China Strategic Perspectives* No. 18 (Washington, DC: National Defense University, 2023).

can be applied in military domains.[161] China is considered to be advancing its capabilities in these domains, as they play an important part in its military modernisation, especially given that Chinese leaders view the nature of warfare as shifting from "informatised" (信息化) warfare to future "intelligentised" (智能化) warfare.[162] China is highly focused on excelling in, and becoming self-sufficient, if not dominant, in a range of emerging and dual-use technology areas such as AI, quantum information, and semiconductors, which have both commercial and military implications.[163] For instance, in the strategically important area of AI, as analyst Elsa B. Kania points out, AI is highly prioritised by the PRC, which is employing a civil-military fusion approach to achieve its goals and enhance its military capabilities.[164]

Related to these priorities are areas such as cyber and space. With regard to cyberspace, Xi Jinping has stated that "without cybersecurity, there is no national security. Without informatisation, there is no modernisation."[165] China is assessed to be enhancing its abilities to undertake sustained cyberattacks to, for example, disrupt critical infrastructure for several days or weeks against adversaries such as the US.[166] Closer to its region, China is also considered to have capabilities to "initiate soft kill, hard kill, and electronic attacks on the western region of the First Island Chain, blocking communication and blanking signals."[167] Similarly, China is also making significant investments in the space domain. It is advancing its development in the military dimension, but it is also expanding in commercial applications.[168] Regarding its counterspace capabilities, the US DoD argues that the PRC is developing capabilities "including direct-ascent anti-satellite missiles, co-orbital satellites, electronic warfare, and directed-energy systems—that can contest or deny an adversary's access to and operations in the space domain."[169] As such, non-traditional military domains are becoming increasingly important, and hence also imperative to observe and research.

China's defence industry as part of the national military power

China's defence industry is an integral part of its military capabilities. China's rapid and expansive military buildup has been closely connected with the progress of its defence industrial complex. For instance, in 2005, Evan S. Medeiros et al. evaluated the prospects of China's future military capabilities by analysing China's defence industrial complex and assessing its improvements. The authors found that selected Chinese enterprises were designing and producing increasingly advanced weapons relevant to its long-term military presence and interests in the near region.[170] The literature on China's defence industry has certainly noted China's improvements in this area. Researchers have identified that China has undertaken major technological progress in virtually the entire spectrum of its defence industry, from traditional sectors such as sea

161 See, for example, U.S. Department of Defense. *Military and Security Developments (*2023); Elsa B. Kania. *Battlefield Singularity: Artificial Intelligence, Military Revolution, and China's Future Military Power* (Washington, DC: Center for a New American Security, 2017); Elsa B. Kania. Artificial intelligence in China's revolution in military affairs. *Journal of Strategic Studies* 44:4 (2021): pp. 515–542; Ali Stickings and Veerle Nouwens. The Implications of Chinese Developments in Non-Kinetic Space Technology. R*USI Newsbrief* 38:3 (2018); David Chen. *China's Space Capability and What This Means for the West* (Montgomery: Air University China Aerospace Studies Institute, 2024); Institute for National Defense and Security Research. *2021 Report on the Defense Technology Trend Assessment – Assessment of the New Generation of Chinese Communist Party's Military technology* (7 June 2022).

162 Kania. Artificial intelligence in China's revolution in military affairs.

163 U.S. Department of Defense. *Military and Security Developments (*2023).

164 Kania. *Battlefield Singularity: Artificial Intelligence, Military Revolution, and China's Future Military Power.*

165 Tsung-Han Wu and Chia-Ling Hung. Cyber Warfare Capabilities of the PLA Strategic Support Force (SSF). In Institute for National Defense and Security Research (eds.). 2*021 Report on the Defense Technology Trend Assessment—Assessment of the New Generation of Chinese Communist Party's Military Technology* (7 June 2022), p. 97.

166 U.S. Department of Defense. M*ilitary and Security Developments (*2023).

167 Wu and Hung. C*yber Warfare Capabilities of the PLA Strategic Support Force (SSF)*, p. 108.

168 Chen. C*hina's Space Capability and What This Means for the West.*

169 U.S. Department of Defense. *Military and Security Developments (*2023), p. VI. See, also, Jonas Vidhammar Berge and Henrik Stålhane Hiim. Killing them softly: China's counterspace developments and force posture in space. *Journal of Strategic Studies* volume 47, issue 6–7 (2024): pp. 940–963.

170 Medeiros et al. *A New Direction for China's Defense Industry.*

power and aerospace to new domains such as cyber, space, and information technology.[171]

The literature has shown how the PLA in the late 1990s and early 2000s favoured imported weapons platforms over locally produced counterparts. To boost the quality of domestic production, the defence industry underwent transformative reforms.[172] By at least 2010, China had taken steps towards "marketisation" of R&D and production, as the Chinese defence industrial base was becoming increasingly decentralised. There was growing space for local state-owned enterprises (SOEs) and privately owned enterprises to engage in R&D and production (although the largest SOEs continue to hold majority shares of the domestic defence market).[173] China has also sought to leverage advances in technologies and manufacturing processes in the commercial sector to translate them into gains for the defence industry. This civil-military integration approach has been a central feature of China defence industry reforms.[174]

As a result, it appears that the reforms of China's defence industry have had a fair amount of success, given the growing number of new weapons the industry has churned out.[175] There are still some notable weaknesses, however: the industry is too compartmentalised to be efficient and is riddled by rivalries between localities, which impedes cooperation and coordination.[176] Shortcomings have been observed over the years, such as in the development of propulsion systems. The industry has also been noted to rely on access to foreign technologies, while concerns about the quality of the arms produced by Chinese manufacturers remain.[177]

Nonetheless, the literature overall points to the conclusion that China has made notable progress in its defence industry. Four of the world's ten largest defence companies are now Chinese.[178] The country is currently the world's largest shipbuilder by tonnage.[179] According to the US DoD, China is now "capable of producing a wide range of naval combatants, gas turbine and diesel engines, and shipboard weapons and electronic systems, which makes it nearly self-sufficient for all shipbuilding needs."[180] Moreover, over the past two decades, China is assessed to have made significant improvements in its hypersonic missile technologies, while many of its missile programs are judged to be on par with leading international producers.[181] Going forward, outstanding questions revolve around how self-sufficient China can become and to what extent its defence industry can develop, given restrictions and tense relations in the global geopolitical environment.

Thus, in conclusion, as with the industrial capabilities of China more broadly, it remains to be seen how its capabilities in force structure and equipment will develop. To what extent China's increasingly modernised forces will continue to undergo qualitative improvements and field technologically advanced services is essential for future research to follow and understand.

3.2 Intangible factors

There is a growing body of research that explores so-called intangible factors or non-material resources related to China's military capabilities and the PLA (and more broadly within the military power literature, as discussed above). This includes a wide range of aspects such as, *inter alia*, combat experience and readiness,

171 See, for example, Tai Ming Cheung. *Strengths and Weaknesses of China's Defense Industry and Acquisition System and Implications for the United States* (Montgomery: Acquisition Research Program Graduate School of Business & Public Policy Naval Postgraduate School, 25 June 2018); James Mulvenon and Rebecca Samm Tyroler-Cooper. China's Defense Industry on the Path of Reform (The US–China Economic and Security Review Commission, 2009); Richard A. Bitzinger, Michael Raska, Collin Koh Swee Lean, and Kelvin Wong Ka Neng. Locating China's Place in the Global Defense Economy. In Tai Ming Cheung (ed.), *Forging China's Military Might: A New Framework for Assessing Innovation* (Baltimore: Johns Hopkins University Press, 2014); Richard A. Bitzinger. Reforming China's defense industry. T*he Journal of Strategic Studies* vol. 39:5–6 (2016): pp. 762–789; Tai Ming Cheung. The Chinese Defense Economy's Long March from Imitation to Innovation. *Journal of Strategic Studies* Vol. 34:3 (2011): pp. 325-354.

172 Richard A. Bitzinger and Ken Boutin. *China's defence industries: Change and continuity, in Rising China: power and reassurance* (Camberra: ANU E Press, 2009), pp.125–143.

173 Ibid.

174 Brian Lafferty, Aaron Shraberg, and Morgan Clemens. China's Civil–Military Integration. S*ITC* R*esearch Brief 2013–10* (2013); Bitzinger. Reforming China's defense industry.

175 Bitzinger. Reforming China's defense industry.

176 Ibid.; Tai Ming Cheung. The Chinese Defense Economy in the Early 2010s. S*ITC Research Brief 2013-1* (2013), p. 18.

177 Kenneth Boutin. Defense technologies and industrial base. In Richard A. Bitzinger and Nicu Popescu (eds.), *Defence industries in Russia and China: Players and strategies* (Luxembourg: EU Institute for Security Studies, 2017).

178 Seth G. Jones and Alexander Palmer. *Rebuilding the arsenal of democracy—The U.S. and Chinese Defense Industrial Bases in an Era of Great Power Competition* (Washington, DC: Center for Strategic and International Studies, 2024).

179 Jones and Palmer. *Rebuilding the arsenal of democracy - The U.S. and Chinese Defense Industrial Bases in an Era of Great Power Competition.*

180 U.S. Department of Defense. *Military and Security Developments (*2023), *p*. 166.

181 Ibid., p. 166.

personnel competencies, training, civilian-military relations, strategic culture, and fighting morale. In addition to assessing China's aforementioned military hardware development, the literature thus engages with these domains as part of China's overarching military power. Furthermore, such intangible factors influence China's military power from multiple angles, which is relevant for our analytical framework. For example, they can operate as a form of resource availability for the development of the PLA, such as the quality of its military personnel, but they can also constitute conditional factors in the way the PLA organises its force structure or evolves its training and human capital.

Combat readiness, personnel competencies, and training

Intangible factors such as China's lack of combat experience and readiness, personnel competencies, and training are commonly raised topics in the literature when assessing China's military capabilities.[182] A recurring assessment is that the PLA has, over the years, made improvements in areas such as raising education levels, improving the realism of training, enhancing the quality of recruits, and increasing general readiness for a wide range of missions.[183] For instance, Mark R. Cozad has explored the PLA's progress in improving its capabilities to conduct joint operations.[184] He underlines how China, under the Xi administration, has focused on improving all aspects of joint operations, including the PLA's training, personnel, and organisation. Although the ambition pre-dates Xi's rise to power, Xi has likely had a substantial impact on the development of joint operations, particularly in the areas of education, training, and personnel, as the PLA has made notable progress in conducting joint operations.

Research also indicates that the PLA has drawn many lessons from foreign operations. The PLA has been active in gaining experience via non-combat operations outside its borders, through its participation in UN peacekeeping operations (UNPKO), anti-piracy patrols, and engagements in humanitarian disaster relief. International exercises also add to this. Joel Wuthnow identifies that the PLA seeks to learn from other countries and substitute its lack of combat experience with alternative experiences. These include the conduct of "combat-realistic" exercises, advanced wargames and simulations, practical operations within and near its borders such as patrols in the South China Sea, disaster relief, and overseas deployment.[185] As for its overseas deployment, UNPKOs provide the PLA with operational gains in areas such as improving foreign cultural and language skills, learning from other troop-contributing countries, improving planning skills, and engaging junior and mid-ranking officials in high-risk environments.[186]

Yet, the literature identifies continued obstacles for the PLA. For instance, involvement in UNPKOs is expected to gradually improve the PLA's capabilities to operate beyond its borders, but the effects are deemed limited due to various political and operational constraints.[187] Furthermore, even though the PLA has likely improved its combat readiness, it starts from a low baseline. It also remains unclear to what extent these gains have been made. Considering China's repeated reintroduction of initiatives to address the lack of capabilities in joint operations, for example, it is suggested that significant obstacles remain to further progress.[188]

182 See, for example, Mark A. Ryan, David M. Finkelstein and Michael A. McDevitt. *Chinese Warfighting: The PLA Experience since 1949* (New York: Routledge Taylor & Francis Group, 2003); Roy Kamphausen, *The People of the PLA 2.0* (Carlisle: US Army War College Press, 2021).

183 Timothy R. Heath. C*hina's Military Has No Combat Experience: Does It Matter?* (RAND Corporation, 27 November 2018); Michael J. Dahm, *China Maritime Report No. 41: One Force, Two Force, Red Force, Blue Force: PLA Navy Blue Force Development for Realistic Combat Training* (Newport, RI: US Naval War College, 2024); Mark R. Cozad. Toward a More Joint, Combat Ready PLA? In Phillip C. Saunders, Arthur S. Ding, Andrew Scobell, Andrew N.D. Yang, and Joel Wuthnow (eds.). C*hairman Xi Remakes the PLA – Assessing Chinese Military Reforms* (Washington, DC: National Defense University Press, 2019).

184 Cozad. *Toward a More Joint, Combat Ready PLA?*

185 Joel Wuthnow. PLA Operational Lessons from UN Peacekeeping. In Joel Wuthnow, Arthur S. Ding, Phillip C. Saunders, Andrew Scobell and Andrew N.D. Yang (eds.). *The PLA Beyond Borders: Chinese Military Operations in Regional and Global Context* (Washington, DC: National Defense University Press, 2021).

186 Wuthnow. *PLA Operational Lessons from UN Peacekeeping.*

187 Ibid.

188 Cozad. T*oward a More Joint, Combat Ready PLA?*

One of the impediments to stronger capabilities in joint operations may be the poor quality of officers required to perform these operations. For example, Timothy R. Heath stresses that the PLA still battles corruption, while concerns about the quality of training and poor management skills continue to raise doubts about the PLA's combat readiness.[189] In a study by Joel Wuthnow and Phillip C. Saunders, the authors point to major problems in the building of a "modern major general" due to weaknesses in technical skills and leadership, a lack of "joint" education in the system, outdated concepts, pervasive corruption, limited combat experience, and inadequate career incentives for officers to strive for joint assignments.[190] In their assessment, it may take the PLA decades to succeed in developing a modern officer capable of effectively commanding integrated joint operations. Moreover, PLA leaders may have overly narrow perspectives. Research indicates that senior PLA officers seldom broaden their career experience, but instead stick to their functional assignments in the same service area. This rigidity in assignments may undermine China's effectiveness, especially in operations requiring jointness and flexibility.[191] Future PLA leaders are likely to gain more experience with advanced technology and new operational doctrines, but it might take time.

The literature also contains arguments that contend that China's military strength might be significantly overrated since its combat abilities are unproven. Paul Dibb suggests there is a tendency to assess an authoritarian China using quantitative measures of weapons and raw manpower, and thereby ignore the qualitative characteristics that are often decisive on the battlefield.[192] He points to China's pervasive corruption as a factor preventing sufficient innovation and adaptability from translating into qualitative strength on the battlefield, while highlighting the shortage of professionally trained non-commissioned officers, which exacerbates distrust at the operational level. Dibb also raises doubts regarding China's military training and the suitability of its composition for real operations.

Cozad et al., however, caution against defining experience solely through combat participation. When assessing the PLA's capabilities and readiness, the authors argue that the PLA's experience must be considered via the myriad of different layers of both combat and non-combat experiences, including deployments such as peacekeeping, disaster relief, and international exercises.[193] While having very limited combat experience, it is noted that "the PLA has gained experience through a highly structured internal process characterized by lessons learned, concept development, experimentation, demonstration, and implementation across the force." The PLA's approaches to training and exercises, as well as its tools and infrastructure needed for improvements in areas such as joint operations, are thus deemed to be improving. But the advances are merely "nascent in the absence of experiential pressures like those faced by the United States."[194]

Fighting morale, civil-military relations, and strategic culture in the PLA

Intangible factors that concern human capital may encompass a large variety of areas. This overview does not cover all of them, but a few more are worth mentioning, including the PLA's fighting morale, China's civilian-military relations, and the strategic culture within the military.

The morale among PLA soldiers is a topic of discussion in the literature. Since the PLA is the armed forces of the Chinese Communist Party (CCP) rather than the Chinese government or the nation, it is ultimately tasked with safeguarding the Party and its rule. An issue raised in the literature is therefore whether this may affect the morale of the PLA soldiers, as they are essentially fighting to uphold a system that benefits its millions of CCP members rather than the broader population as a whole.[195]

Similar arguments are made regarding China's civil-military relations. Because the PLA is not a state military, it is considered to lack in sufficient points of contact between military officials and state bodies. In

189 Heath. *China's Military Has No Combat Experience: Does It Matter?*

190 Joel Wuthnow and Phillip C. Saunders. A Modern Major General: Building Joint Commanders in the PLA. In Saunders, et al., C*hairman Xi Remakes the PLA.* Joel Wuthnow. Gray Dragons: Assessing China's Senior Military Leadership. *China Strategic Perspectives 16* (Washington, DC: National Defense University Press, 2022).

191 Wuthnow. Gray Dragons: Assessing China's Senior Military Leadership.

192 Paul Dibb. Be alert to China's military weaknesses, *The Strategist* (Sidney: Australian Strategic Policy Institute, 2023).

193 Mark Cozad, Keith Gierlack, Cortez A. Cooper III, Susan G. Straus, Sale Lilly, Stephanie Anne Pillion, and Kelly Elizabeth Eusebi. *Preparing for Great Power Conflict: How Experience Shapes U.S. and Chinese Military Training* (RAND Corporation, 2023).

194 Ibid.

195 Chase, et al. *China's Incomplete Military Transformation: Assessing the Weaknesses of the People's Liberation Army (PLA)*; Morgan Clemens and Bejamin Rosen. The Impact of Reform on the PLA's Political Work System. In Roy D. Kamphausen (ed.). *The People of the PLA 2.0* (Carlisle: Strategic Studies Institute and US Army War College, 2021).

the view of some analysts, this has created a civil-military gap resulting in coordination deficiencies between the PLA's activities and China's overarching foreign and security policies, which has led to hands-off management from the top civilian leadership.[196] This may manifest in differences in positioning between state bureaucracies and the PLA in foreign policy and security events. Furthermore, it has been shown how China tries to elevate human capital within the PLA by seeking to absorb more service members from the civilian educational institutions into the military field.[197]

Lastly, the literature also pays attention to the strategic and organisational culture within the PLA, which may impact its development.[198] For instance, issues that are highlighted include high-level corruption plaguing the PLA, low pay levels relative to the civilian economy, overly centralised decision-making, and cultural as well as organisational factors mentioned above: a culture of insufficient training and a lack of overseas experience, which results in ignorance or limited knowledge about external factors.[199] Connected with this last point, literature has also pointed out the possibility that PLA leaders may be unwilling or indifferent to learning from outside experiences due to a sense of superiority and overconfidence in their own preparations and capabilities.[200] Adding to these dynamics is also the unique feature and role of political commissars and party committees in the PLA, which could have a negative impact on China's military effectiveness.[201]

Thus, considering that intangible factors that are not only difficult to measure but also constantly evolving and influenced by a wide range of elements, this is an area with many unknowns. The role of intangible factors and how they affect China's military power therefore remains an area that requires further research and understanding.

3.3 China's overseas defence operations and relations

China's external defence operations and relations also have an impact on the shape and development of its military power. The literature recognises that by developing capabilities and infrastructure through, and for, operations abroad, the PLA is enabled to project power. Likewise, developing stronger defence relations with other nations also strengthens China's military power. At an analytical level, China's overseas defence operations and relations thus affect Chinese military power both as a military resource and as a conditional factor.

PLA's overseas defence operations

The literature underscores how Beijing, over the past decade, has increasingly devoted attention to developing expeditionary military capabilities to protect its interests in and beyond East Asia.[202] Even though Chinese expeditionary operations so far have been comparatively limited, China has steadily enhanced its capabilities to operate beyond its borders. As highlighted in the literature, the PLA nowadays engages with foreign militaries in a number of joint bilateral and multilateral military exercises and training events, while also participating in numerous security dialogues and forums with foreign counterparts.[203] It also undertakes overseas tasks such as counterpiracy operations, peacekeeping missions, non-combatant evacuation operations, and humanitarian assistance and disaster relief.[204] To this end, its most developed capabilities for its expeditionary operations are in the maritime domain. But China has also advanced in other domains, such as supporting capabilities in

196 Andrew Scobell. Is There a Civil-Military Gap in China's Peaceful Rise? *Parameters* vol. 39 (2009): pp. 4–20.

197 Brian Waidelich and Bernard D. Cole. The People's Liberation Army in 2019: Education and People's War. In Kamphausen (ed.). T*he People of the PLA 2.0.*

198 Examples of work on China's strategic culture: Johnston. *Cultural Realism: Strategic Culture and Grand Strategy in Chinese History*; Andrew Scobell. C*hina's Use of Military Force: Beyond the Great Wall and the Long March* (Cambridge: Cambridge University Press, 2003).

199 Chase, et al. C*hina's Incomplete Military Transformation: Assessing the Weaknesses of the People's Liberation Army (PLA).*

200 Joel Wuthnow. Rightsizing Chinese Military: Lessons from Ukraine. S*trategic Forums 1* (Washington, DC: National Defense University Press, 2022).

201 Wuthnow. Gray Dragons: Assessing China's Senior Military Leadership.

202 Kirsten Gunness. The PLA's Expeditionary Force: Capabilities and Trends. In Joel Wuthnow, Arthur S. Ding, Phillip C. Saunders, Andrew Scobell and Andrew N.D Yang (eds.). T*he PLA Beyond Borders: Chinese Military Operations in Regional and Global Context* (Washington, DC: National Defense University Press, 2021); Lucie Béraud-Sudreau, David Brewster, Christopher Cairns, Roger Cliff, R. Evan Ellis, April Herlevi, Roy Kamphausen, Roderick Lee, Paul Nantulya, Meia Nouwens, Rebecca Pincus, and Joel Wuthnow. E*nabling a More Externally Focused and Operational PLA—2020 PLA Conference Papers* (Carlisle: US Army War College Press, 2022); Joris Teer, Juliëtte Eijkelkamp, and Paul van Hooft, China Outside the Western Pacific: Resources to Sustain Power Projection. In Joris Teer, Tim Sweijs, Paul van Hooft, Lotje Boswinkel, Juliëtte Eijkelkamp, Jack Thompson (eds.). C*hina's Military Rise and the Implications for European Security* (The Hague: The Hague Centre for Strategic Studies, 2021).

203 Béraud-Sudreau et al., E*nabling a More Externally Focused and Operational PLA.*

204 U.S. Department of Defense. M*ilitary and Security Developments (*2023); Gunness. T*he PLA's Expeditionary Force: Capabilities and Trends.*

logistics and infrastructure, which would enable its potential to expand its global military presence.[205]

Despite these developments, research has also identified obstacles that the PLA needs to overcome before it can field fully capable forces to address its security concerns abroad. In an overview of Chinese capabilities for overseas operations, Kirsten Gunness highlights that the PLA faces key challenges in areas such as: command, control, and coordination of overseas forces; the need to balance resources between forces near China and those deployed far from its border; lack of experience and realistic training for personnel; and basing and logistics.[206] Many of these challenges echo some of the weaknesses mentioned above in Section 3.1, on China's force structure and equipment.

Regarding China's lack of overseas basing, it is somewhat unclear to what extent China will expand its global basing network. There is a notion in the literature that China holds a minimalist global military posture compared to other major powers, in proportion to its large economic presence and vast diplomatic global engagements. Indeed, China has displayed that it has expanded its activities in constructing military installations and undertaking military activities in recent years, particularly in its near region. In 2017, China opened its first, and still only, truly overseas military base in Djibouti. However, Andrew Scobell contends that China has been far less inclined to "project or station armed forces beyond its immediate neighbourhood."[207] Measured by its limited overseas deployments and basing, China is thus identified as having taken a "great-power-lite" approach to its global military posture. Scobell assesses that China is likely to continue on the path of making a "soft military footprint" overseas and tread cautiously in its expansion of global bases. Other studies highlight Beijing's pursuit of a "strategic strongpoint model," in which it relies on commercial overseas ports operated by Chinese firms that can function as dual-use facilities, even though this approach comes with significant shortcomings for military purposes.[208]

However, there are also notable expectations in the literature that China will expand its network of military bases overseas in the near future.[209] Studies suggest that if Beijing were determined to do so, it could develop a global basing network within the coming two decades. Possible locations for such a network, as discussed in the literature, include South and Southeast Asian countries such as Cambodia, Pakistan, Bangladesh, and Myanmar, or Middle Eastern and African countries such as Oman, Kenya, and Tanzania.[210]

China's external defence relations

China's overseas military operations also intersect with its external defence relations. Analysts and commentators have highlighted a range of activities that China engages in on the international scene. It holds bilateral meetings with senior military or civilian defence leaders, while also participating in multilateral security dialogues and forums such as the Shangri-La Dialogue and China-Africa Peace and Security Forum, or meetings organised by the Shanghai Cooperation Organisation and BRICS (Brazil, Russia, India, China, South Africa).[211] It also pursues professional military academic exchanges, undertakes port calls and facilitates training, conducts military exercises and joint patrols with foreign militaries, as well as participating in UN peacekeeping operations.[212] Adding to this is, of course, the sale of military arms and equipment to foreign militaries.

Together these interactions are deemed by many to contribute to the PLA's operational capabilities and, by extension, its overall military power. Philip Saunders describes China's military efforts overseas as both addressing strategic goals, such as influencing and shaping the international security environment, and seeking to expand operational capabilities.[213] Kristen Gunness offers a similar characterisation, but also adds the goals of strengthening cooperation with key partners in important economic regions and defending its

205 Gunness. T*he PLA's Expeditionary Force: Capabilities and Trends.*

206 Ibid.

207 Andrew Scobell. China's Minimalist Global Military Posture: Great Power Lite? A*sian Security* 19:1 (2023): pp. 1–25.

208 Isaac B. Kardon. China's Overseas Base, Places, and Far Seas Logistics. In Wuthnow, et al., T*he PLA Beyond Borders: Chinese Military Operations in Regional and Global Context* (Washington, DC: National Defense University Press, 2021).

209 U.S. Department of Defense. M*ilitary and Security Developments (*2023).

210 Cristina L. Garafola, Stephen Watts, and Kristin J. Leuschne. C*hina's Global Basing Ambitions: Defense Implications for the United States* (RAND Corporation, 2022); U.S. Department of Defense. M*ilitary and Security Developments (*2023).

211 U.S.–China Economic and Security Review Commission. 2*023 Report to Congress of the U.S.–China Economic and Security Review Commission* (2023).

212 Ibid.

213 Phillip Saunders. C*hina's Military Diplomacy: Trends and Implications.* Testimony before the U.S.–China Economic and Security Review Commission Hearing on "China's Military Diplomacy and Overseas Security Activities." (The U.S.–China Economic and Security Review Commission, 26 January 2023).

interest within the broader context of the US-China rivalry.[214] But China also views its interactions with foreign militaries as a means to oppose "anti-China" positions and to seek alignment in countering what it perceives as US-led global hegemony. As some have argued, there is a driving motivation in the PLA's foreign interactions to boost its international image and promote narratives that portray China as contributing positively to international peace and security.[215] As such, China's foreign military relations also serve to bolster its soft power.

Research has shown that the PLA undertakes a wide range of operations with various counterparts in different regions. Indeed, the evolving Sino-Russian military cooperation is gaining much attention. One important feature is the notion that China's military activities with Russia have become not only more frequent but also deeper and more expansive, despite certain limitations.[216] But China's foreign military relations are also evolving in different regions. For example, Lucie Béraud-Sudreau and Meia Nouwens have found that, in its exchanges with European countries, China's military relations principally consist of joint exercises, port calls, seminars, and high-level officer exchanges.[217] Most of these interactions are with Western European countries, and nearly all have revolved around non-combat areas such as humanitarian relief, medical support, counterterrorism, and counterpiracy operations. However, it is noteworthy that these interactions have involved activities applicable to military operations, such as tactical movement, naval gunnery exercises, refuelling-at-sea exercises, and helicopter operations. In China's interactions with African countries, on the other hand, only a minority of the interactions consist of exercises and port calls, while most exchanges involve senior officer and personnel exchanges.[218]

Chinese defence operations and military relations are thus evolving and are of interest for further research. They are shaped in different ways and adapt to a variety of purposes depending on the partner and activity. But as demonstrated in the literature, they are seen as important tools for the PLA to advance its capabilities and thereby contribute to the dynamics of China's military power.

3.4 China's perceptions and ideational foundations of its military power: military strategies and doctrines

Lastly, an essential feature in the literature concerns Chinese perceptions and thinking about the meaning of military power, how to use it, and its relation to broader national strategic objectives, especially military-political goals. Reflected in these perceptions are the strategies and doctrines formulated by China, which outline China's ideational foundations for how military forces will be employed to advance military objectives that, in turn, relate to its political goals. Perceptions and strategic thinking thus constitute important aspects of understanding China's military power. As such, the literature has discussed and analysed the strategies that, over the years, have been crafted for the PLA, as well as its doctrines and operational concepts.[219] In addition, research has also included discussions on how China views its use of military capabilities, such as the role of deterrence and how to effectively leverage its influence

214 Kristen Gunness. C*hina's Overseas Military Diplomacy and Implications for U.S. Interests.* Testimony presented before U.S.–China Economic and Security Review Commission on January 26, 2023 (Santa Monica: Rand Corporation, 2023).

215 Gunness. T*he PLA's Expeditionary Force: Capabilities and Trends;* Kardon. China's Overseas Base, Places, and Far Seas Logistics.

216 Mark Cozad, Cortez A. Cooper III, Alexis A. Blanc, David Woodworth, Anthony Atler, Kotryna Jukneviciute, Mark Hvizda, and Sale Lilly. F*uture Scenarios for Sino-Russian Military Cooperation: Possibilities, Limitations, and Consequences* (Santa Monica: RAND Corporation, 2024); Oriana Skylar Maestro. Sino–Russian Military Alignment and Its Implications for Global Security. S*ecurity Studies* vol. 33:2 (2024): pp. 254-290; Christopher Weidacher Hsiung. C*hina's perspective on Russia—Assessing how Beijing views and values its relationship with Russia,* FOI-R--5267--SE (Stockholm, Swedish Defense Research Agency, 2022).

217 Béraud-Sudreau et al. E*nabling a More Externally Focused and Operational PLA.*

218 Ibid.

219 See, for example, Paul H.B. Godwin. Front Continent to Periphery: PLA Doctrine, Strategy, and Capabilities towards 2000. C*hina Quarterly* No. 146 (1996): pp. 464–487; David M. Finkelstein. China's National Military Strategy: An Overview of "Military Strategic Guidelines." In Andrew Scobell and Roy Kamphausen (eds.). R*ight Sizing the People's Liberation Army: Exploring the Contours of China's Military* (Carlisle: Army War College, 2007), pp. 69–104; U.S. Department of Defense. M*ilitary and Security Developments (*2023); Edmund J. Burke, Kristen Gunness, Cortez A. Cooper III, and Mark Cozad. P*eople's Liberation Army Operational Concepts* (RAND Corporation, 2020); M. Taylor Fravel. A*ctive Defense: China's Military Strategy since 1949* (Princeton: Princeton University Press, 2019); Joel Wuthnow, & M. Taylor Fravel. China's military strategy for a "new era": Some change, more continuity, and tantalizing hints. J*ournal of Strategic Studies* 46:6–7 (2022): pp, 1149–1184.

and power as means to its goals.[220] Issues like these relate to our analytical framework in overlapping ways. For instance, by examining how China views its domestic and international use of military capabilities, it aligns analytically with the study of China's perceptual inputs, but, at the same time, by looking into the content and application of China's strategies, doctrine, and operational concepts also allows the study to understand the conditional factors shaping China's military power.

China's military strategy and operational concepts

The PRC emphasises the importance of strengthening the PLA into a "world class" military by 2049 to advance its overarching goal of becoming a "great modern socialist country."[221] China's defence policy is oriented towards safeguarding its national sovereignty, security, and development interests, for which a modernised and powerful military is regarded as an essential instrument. Deriving from this, its military strategy is based on the so-called "active defense," a concept that the US DoD describes as adopting "the principles of strategic defense in combination with offensive action at the operational and tactical levels."[222] The concept stems from the principle of not initiating armed conflict, but at the same time responding with force if China is challenged. It thus involves not only defensive aspects but also offensive and pre-emptive dimensions whereby China can defend its interests by acting externally.

The foundation of China's military strategy rests on the "strategic guidelines," which have been adopted and developed nine times since 1949. Over time, three of these nine guidelines entailed new military strategies or significant shifts from previous guidelines, while the other six reflected adjustments to the existing strategy.[223] The three guidelines in 1956, 1980, and 1993 that represented major changes were advanced from the highest level of the Party. They thus stemmed from the military thought of the highest leaders—Mao Zedong in 1956, Deng Xiaoping in 1980, and Jiang Zemin in 1993—who respectively supported their grand strategies of "revolution," "recovery," and "building comprehensive national power."[224] These military strategic guidelines provide general guidance and have subsequently guided the issuance of operational regulations for the PLA's operational doctrine and training, as well as set priorities for its structure, planning, and modernisation.[225] The operational regulations, which were last updated in 1999, derive from the strategic guidelines and are likely to represent PLA doctrine.[226] The PLA's operational regulations are not publicly available, but through military publications and other sources pertaining to China's military campaign planning and operational concepts, insights can be attained into PLA doctrine.[227] The 1999 update to the operational regulations included both joint campaigns and service-specific campaigns. The trend toward "jointness" has continued under Xi Jinping, however, leading the literature to suggest that the PLA doctrine is likely "in flux."[228] As pointed out in the DoD report, since PLA writings outline the PLA's combat style as integrating joint operations under a unified joint operations command system, it might be "out of step with the 2015-era structural command and organizational reforms and an obstacle to advancing the next steps in building a unified joint PLA."[229]

Indeed, the strategic guidelines contribute to analysing what changes and adjustments in operational

220 See, for example, Nathan Beauchamp-Mustafaga, Derek Grossman, Kristen Gunness, Michael S. Chase, Marigold Black, Natalia D. Simmons-Thomas. D*eciphering Chinese Deterrence Signalling in the New Era—An Analytic Framework and Seven Case Studies* (Santa Monica: RAND Corporation, 2021); Dean Cheng. E*volving Chinese Thinking About Deterrence: What the United States Must Understand About China and Space* (Heritage Foundation, 29 March 2018); Roy D. Kamphausen and Jeremy Rausch. Introduction: China's Evolving Thinking on Deterrence. In Roy D. Kamphausen (ed.). *Modernizing Deterrence: How China Coerces, Compels, and Deters* (Washington, DC: The National Bureau of Asian Research, 2023).

221 Xi Jinping." 决胜全面建成小康社会 夺取新时代中国特色社会主义伟大胜利——在中国共产党第十九次全国代表大 会上的报告" [Secure a Decisive Victory in Building a Moderately Prosperous Society in All Respects and Strive for the Great Success of Socialism with Chinese Characteristics for a New Era—Report Delivered at the 19th National Congress of the Communist Party of China], (27 October 2017).

222 U.S. Department of Defense. M*ilitary and Security Developments (*2023), p. 35; Fravel *Active Defense: China's Military Strategy since 1949.*

223 Andrew Scobell, Edmund J. Burke, Cortez A. Cooper III, Sale Lilly, Chad J.R. Ohlandt, Eric Warner, and J.D. Williams. C*hina's Grand Strategy – Trends, Trajectories, and Long-Term Competition* (Santa Monica: RAND Corporation, 2020).

224 Ibid.

225 U.S. Department of Defense. M*ilitary and Security Developments* (2023), p. 35; M. Taylor Fravel A*ctive Defense: China's Military Strategy since 1949.*

226 Scobell et. al. .*China's Grand Strategy—Trends, Trajectories, and Long-Term Competition.*

227 Fravel. A*ctive Defense: China's Military Strategy since 1949; S*cobell et al. C*hina's Grand Strategy—Trends, Trajectories, and Long-Term Competition.*

228 Ibid.

229 U.S. Department of Defense. M*ilitary and Security Developments (*2023), p. 35.

concepts mean for the PLA's conduct of warfare.[230] In the latest major change of strategy, in 1993, the PLA were directed to win "local wars" under "high technology conditions." Since then, the strategic guidelines have been adjusted twice. The first adjustment in 2004 set out for the PLA to prepare for "winning local wars under informatised conditions," while the second update in 2014 directed the PLA to improve its ability to conduct joint operations and increase focus on the maritime domain, as well as fighting and "winning informatised local wars."[231] Recently, the term "intelligentised warfare" has gradually appeared in the Chinese conceptualisation, along with the modernisation of its military forces.[232]

Research has pointed to how the operational concepts developed along with these strategic guidelines serve as essential indicators of how the PLA would fight in a war. Widely noted in the literature, these adjustments account for the constantly changing nature of battlefield technologies and for lessons the PLA has learned from external conflicts as well as internal exercises.[233] This way, the information domain sits at the forefront of the PLA's ideational fundaments for China's way of war, as the application of information technologies in warfare has been of particular importance in China's doctrinal evolution. In the recent guidelines to winning "informatised local wars," it is noted that China identifies information as an important domain in which not only war takes place, but which is also to be used as a means for waging military warfare in a confrontation between "information-based systems-of-systems."[234] The PLA's view of warfare is a confrontation between two operational systems battling each other, rather than a war of annihilation between two mechanised forces.[235] In other words, the destruction of systems is a likely guiding principle in China's way of war.[236] Furthermore, operational concepts such as that war control depends on information dominance and that combat space is shrinking while war space is expanding further cement the constitutive principles and doctrines by which the PLA strives to advance in accordance with its goals.[237]

The significance of the information domain is also seen in the analysis of the doctrinal guidelines for the PLA's joint operations. It is found that "the PLA seeks to become a force capable of prosecuting 'integrated joint operations' in multiple battlespace domains in an era of information-centric warfare and future intelligent warfare."[238] Integrated joint operations are consistently connected to advances in "informatised warfare." David M. Finkelstein points out that the PLA perceives informatised warfare as a conflict in which systems are faced against each other, not merely separate units pitted against other units.[239] Integrated joint operations are therefore seen as capitalising on new technologies to enable and simultaneously undertake operations in multiple battlefields with many different services.[240]

Finally, the literature also discusses the evolution of the PLA's military strategy in relations to its actions. For example, by analysing China's military strategies since 1949, Taylor Fravel argues that China has indeed undertaken major changes in its military strategy in response to shifts in the conduct of warfare, but that these changes have only occurred when the CCP is stable and united.[241] As such, Fravel finds that the party's perception of being safe and not divided has an important influence on the PRC's willingness to make major changes in its military strategy. In other words, intra-party politics have a significant impact on the evolution of China's military strategy, even if this comes at the expense of potentially necessary changes in military strategy and the conduct of warfare.

230 For recent literature, see, for example, Burke, et al. P*eople's Liberation Army Operational Concepts;* David M. Finkelstein. T*he PLA's New Joint Doctrine: The Capstone of the New Era Operations Regulations System* (Washington, DC: CNA National Security Analysis, 2021); Wuthnow & Fravel. China's military strategy for a "new era"': Some change, more continuity, and tantalizing hints; Scott J. Tosi. Xi Jinping's PLA Reforms and Redefining "Active Defense." M*ilitary Review* (2023).

231 Fravel. A*ctive Defense: China's Military Strategy since 1949,* pp. 7–8; U.S. Department of Defense. M*ilitary and Security Developments (*2023), p. 37.

232 The concept of "intelligentisation" (智能化) refers to what Wuthnow and Fravel describes as "military applications of disruptive technology, often pursued through partnerships with China's civilian science and technological sector, such as artificial intelligence, robotics, unmanned systems, hypersonics, nanotechnology, and biotechnology." See Wuthnow & Fravel. China's military strategy for a "new era"': Some change, more continuity, and tantalizing hints, p. 1173.

233 Finkelstein. T*he PLA's New Joint Doctrine: The Capstone of the New Era Operations Regulations System.*

234 Burke et al. P*eople's Liberation Army Operational Concepts,* p. 1.

235 U.S. Department of Defense. M*ilitary and Security Developments (*2023).

236 Burke et al. P*eople's Liberation Army Operational Concepts,* p. 8.

237 Ibid., p. 1.

238 Finkelstein. T*he PLA's New Joint Doctrine: The Capstone of the New Era Operations Regulations System.*

239 Ibid.

240 U.S. Department of Defense. M*ilitary and Security Developments (*2023); Finkelstein. T*he PLA's New Joint Doctrine: The Capstone of the New Era Operations Regulations System.*

241 Fravel. A*ctive Defense: China's Military Strategy since 1949.*

Against that background, it is notable that the literature points out that China has adjusted its military strategic guidelines for the "new era" since 2019.[242] Yet, as concluded by Wuthnow and Fravel, a review of these adjustments indicates no major change in strategy since 2019, unlike the three previous major shifts in adopted strategies throughout the PLA's history, in 1956, 1980, and 1993.[243] The strategy appears to align with the consolidation of Xi's control over the PLA and is viewed as being adopted primarily in response to political considerations. It may also reflect a reaction to global geopolitical competition and the rapid acceleration of technological change. In other words, the new military strategy is not seen as a major transformation of how the PLA would wage war, but rather as a rebranding of the strategy updated in 2014 from the 2004 revision, which was itself most importantly an update of the 1993 strategy. However, it is speculated whether this rebranding may foreshadow a coming substantive shift in strategy, in which growing attention to "intelligentisation" and updated concepts of joint operations is considered likely.[244]

China's approach to deterrence

An important feature of Chinese military power and its military strategies is China's thinking about deterrence. The way Beijing views and employs deterrence and deterrence signalling also affects its actions and the methods through which China projects and exercises not only military power but national power as a whole. The literature on Chinese military power thus often also involves discussions on Chinese perceptions of deterrence.

Research has found that China takes a comprehensive approach to deterrence and deterrence signalling.[245] Military strength is indeed one component of China's approach to the craft of deterrence, but it is also integrated with economic leverage and diplomatic influence. The Chinese objective in pursuing deterrence is not only to prevent undesired actions from an adversary, but also to compel other actors to undertake actions that align with China's interests. As such, the literature seeks to understand how China employs the psychological and coercive aspects of its deterrence strategy against its adversaries.

Given this expansive view of deterrence, the literature seeks to grapple with how Chinese deterrence signalling is developing and how it is being employed. China is found to view grey-zone activities and coercion as an extension of its power, using such tactics to influence and shape the external environment.[246] A prominent notion is that China's employment of military deterrence signalling has evolved along with its capabilities and various channels that it uses to exert political coercion. For instance, Beauchamp-Mustafaga et. al conclude that China now adopts military signalling more frequently through new communication channels and with new capabilities, such as displaying missiles in military parades or deploying bomber flights and carriers in disputed territories.[247] In light of China's growing capabilities, some analysts have highlighted that Beijing's thinking about deterrence may be undergoing a shift, in which "military and nonmilitary capabilities combine to create an 'integrated strategic deterrence' posture aimed to protect China's interests."[248]

Indeed, China's rapid modernisation of its nuclear forces, coupled with growing conventional capabilities, may provide Beijing with enhanced leverage in its approach to strategic deterrence. But, at the same time, analysts such as Andrew S. Erickson also emphasise how China increasingly holds unique conventional deterrence capabilities through a combination not only of advanced missile systems and opaque decision-making, but also what he refers to as Beijing's disregard for confidence-building.[249] Related to the PLA's growing capabilities, the importance of the space and cyber domains also comes to light in Beijing's leverage of

242 U.S. Department of Defense. M*ilitary and Security Developments (*2023); Wuthnow & Fravel. China's military strategy for a "new era"': Some change, more continuity, and tantalizing hints.

243 Wuthnow & Fravel. China's military strategy for a "new era"': Some change, more continuity, and tantalizing hints.

244 Ibid.

245 See, for example, Beauchamp-Mustafaga, et al., D*eciphering Chinese Deterrence Signalling in the New Era - An Analytic Framework and Seven Case Studies;* Cheng. E*volving Chinese Thinking About Deterrence: What the United States Must Understand About China and Space;* Kamphausen and Rausch. I*ntroduction: China's Evolving Thinking on Deterrence.*

246 Bonny Lin, Christina L. Garafola, Bruce McClintock, Jonah Blank, Jeffrey W. Hornung, Karen Schwindt, Jennifer D.P. Moroney, Paul Orner, Dennis Borrman, Sarah W. Denton, and Jason Chambers. *Competition in the Gray Zone—Countering China's Coercion Against U.S. Allies and Partners in the Indo-Pacific* (Santa Monica: RAND Corporation, 2022); Burke, et al., P*eople's Liberation Army Operational Concepts.*

247 Beauchamp-Mustafaga, et al., D*eciphering Chinese Deterrence Signalling in the New Era - An Analytic Framework and Seven Case Studies.*

248 Kamphausen and Rausch. I*ntroduction: China's Evolving Thinking on Deterrence.*

249 Andrew S. Erickson. China's Approach to Conventional Deterrence. In Kamphausen (ed.), M*odernizing Deterrence: How China Coerces, Compels, and Deters.*

deterrence. As China conceptualises "integrated strategic deterrence" as its prime deterrence—encompassing both military and non-military power—space and cyber capabilities are regarded as increasingly important tools for both preventing and shaping adversaries' behaviour.[250] In the space domain, it has been argued by some that the Chinese focus for space deterrence is primarily about compellence, rather than the need to dissuade or deter an adversary from engaging in space activities.[251] Others, however, emphasise that deterring attacks from adversaries is also important in the space domain.[252]

Related to this is the literature on how individuals in the PLA think about and discuss the issue of "escalation control," though PLA writings tend to avoid the term itself in favour of terms such as "war control," "crisis management," and "war situation control." In a comprehensive study on the topic, Kaufman and Hartnett, for instance, found that China seems to identify a continuum with a series of stages in the progression of a crisis or conflict.[253] Moreover, PLA writings ascribe different objectives for control and different military activities to each stage on this conflict continuum, while not clearly specifying what divides the pre-war phases of a conflict from a state of war. Interestingly, these writings do not provide a clear indication of how outside observers might perceive the intentions behind military operations, which leads the authors to assess that there is a high risk of misunderstanding during a state of "quasi-war."[254]

Adding to the complexity, the literature also includes the notion that, in order to comprehend China's "integrated deterrence," research must consider the entire Party-state system, and not only the PLA.[255] As Beijing tends to employ a different vocabulary and often presents its actions as a victim's response rather than as acts of coercion, it is important to analyse and contextualize it within the broader state discourse. Thus, to understand the totality of China's approach to deterrence as a component of its military strategy, it is argued that a comprehensive perspective is required. This point is equally compelling when it comes to research on China's strategies and conceptual development more generally. The need to consistently discern and analyse adjustments or ongoing debates in China's military strategy, doctrinal updates, and operational concepts remains vital. This is a domain that reflects Chinese perceptions and thinking on the conduct of warfare, and by extension, also speaks directly to China's military power. Further insight into how China develops and shapes its military capabilities and power stands to benefit from deepener study in this area.

3.5 Concluding remarks

The study of the PLA and China's military power is growing tremendously in both breadth and depth. Along with the PLA's own development, the research field has evolved into studying various aspects and disciplines of China's military affairs, using a variety of Chinese source materials. As Ian Burns McCaslin and Andrew S. Erickson point out, the demographics of PLA-focused scholars have also evolved. Many of today's younger contributors to the field have spent considerable time in China compared to their predecessors, possess a higher level of fluency in Mandarin, and apply more complex and technology-supported methodologies.[256] However, while this was clearly the case in 2005 when their book was published, the situation today is quite different. As security restrictions on access to the PRC and relevant information are once again tightening, it remains to be seen whether, and to what extent, this will affect the future trajectory of PLA studies.[257]

China's military power is widely assessed to have grown significantly stronger by most analysts in the field. Although weaknesses and challenges are also identified, both tangible and intangible, as demonstrated in this preview, the overarching assessment is that the PLA has substantially strengthened its forces over the past decades.[258] Research on China's military affairs examines

250 Nathan Beauchamp-Mustafaga. Exploring Chinese Thinking on Deterrence in the Not-So-New Space and Cyber Domains. In Kamphausen (ed.). M*odernizing Deterrence: How China Coerces, Compels, and Deters.*

251 Cheng. E*volving Chinese Thinking About Deterrence: What the United States Must Understand About China and Space.*

252 Fiona S. Cunningham. Strategic Substitution: China's Search for Coercive Leverage in the Information Age. I*nternational Security* 47:1 (2022): pp. 46–92.

253 Allison A. Kaufman and Daniel M. Hartnett. *Managing Conflict: Examining Recent PLA Writings on Escalation Control (*CNA Analysis & Solution, 2016).

254 Kaufman and Hartnett. *Managing Conflict: Examining Recent PLA Writings on Escalation Control.*

255 Rachel Esplin Odell. "Struggle" as Coercion with Chinese Characteristics—The PRC's Approach to Nonconventional Deterrence. In Kamphausen (ed.). M*odernizing Deterrence: How China Coerces, Compels, and Deters.*

256 McCaslin and Erickson, T*he People's Liberation Army (PLA)*.

257 Broader issues related to methodology and access to sources are discussed in more depth in Chapter 4.

258 Wuthnow and Saunders summarise what they consider to be the PLA's strengths and weaknesses in their introductory chapter. See Joel Wuthnow and Phillip C Saunders. C*hina's Quest for Military Supremacy* (Cambridge: Polity, 2025).

the PLA's capabilities and power in broad terms, but there is now also an abundance of studies focusing on the PLA's different services or on narrower dimensions of China's military affairs.

Yet, this overview has shown that there is still much that needs to be understood and analysed when it comes to studying China's military power. For instance, the PLA's ability to conduct joint operations, the navy's capacity to operate and project power in and beyond the First Island Chain, and the degree of Chinese sophistication and modernisation in the airspace and underwater domains are just a few examples of areas that require more research. Similarly, the impact of the PLA's limited combat experience or other intangible factors, such as personnel competencies, remain unresolved issues among many others that demand a better understanding. More broadly, there is a continuing need for deeper insights into China's ideational fundaments, perceptions, and strategic thinking regarding issues such as military strategies and the employment of military power.

The issues mentioned above are just a few examples of the many areas in need of further study. The literature increasingly recognises that, as China grows more powerful and influential in the world, the information relevant to studying China's military power is shaped and augmented by both traditional and non-traditional factors within the military sphere. Fields such as economics, history, sociology, and so on can offer valuable insights into the study of the PLA. This recognition has emerged in this review as well, and remains an important insight in contemporary research on China's military power. ■

4. Research methods for the study of military power

Oscar Almén

This chapter focuses on research methodology. It begins with a discussion of the particular challenges related to research methods in studying military issues in general, and military power in particular. Next, the chapter addresses specific methodological issues in studying China's military power, including access to data and other challenges of researching a sensitive subject in an authoritarian setting, followed by an overview of different sources. The chapter ends with a discussion of how the different study factors in the analytical framework presented in Chapter 2 can be studied in practice.

Studying the military does not involve using methods that differ from those employed in disciplines such as political science, sociology, war studies, security studies, and other social sciences to study other social phenomenon. In this sense, there is no specific research method used exclusively to study the military. However, studying military issues may involve challenges and problems that are particular to the military domain, such as gaining access and addressing security concerns that can affect the dissemination of findings.[259]

Methods for researching military power differ depending on how the concept of power is defined. One field of research is concerned with measuring military power, often but not always from a comparative perspective, which we refer to as *power-as-resources* in Chapter 2. These studies use different combinations of metrics to rank nations' military strength. For example, to measure global military capacity, a 2020 RAND report combined military expenditures with the number of nuclear warheads.[260] Another RAND study on the US-China military scorecard relied on data from the IISS *Military Balance* and Jane's databases.[261] FOI's *Defence Economic Outlook* assesses military strength based on military expenditure, military equipment quantities, and equipment quality.[262] Probably the most famous comparative assessment of military power is the net assessment method, first developed by Andrew Marshall, who later became the first Director of the Office of Net Assessment in the US Department of Defense. One fundamental aspect of net assessment is linking defence policies "with the anticipated reactions of the opponent."[263] In net assessment, the "net" is what comes after taking both sides (Red and Blue) into account. In other words, the comparative perspective is a critical component of net assessment. Furthermore, Marshall was clear about the importance of including complex qualitative aspects in the analysis, and he was critical of "mere tabulations."[264] Net assessment is now being used by several Western governments as well as by NATO.

Other studies similarly apply a broad perspective on military power (or related concepts such as capability) but without necessarily comparing different nations. According to FOI's *Russian Military Capability*, "a country's military capability is interpreted as the outcome of not only conditions in the military sector but of a long-term process involving a broad range of underlying factors, for example, the political system and doctrines, social and economic preconditions, technological and

259 Helena Carreriras, Celso Castro & Sabina Frederic (eds.). *Researching the military* (New York: Routledge, 2016); Joseph Soeters, Patricia M. Shields & Sebastiaan Rietjens (eds.). *Routledge Handbook of Research Methods in Military Studies* (New York: Routledge, 2014); Alison Williams, Neil Jenkings, Mathew Rech & Rachel Woodward (eds.). *The Routledge Companion to Military Research Methods* (London: Routledge, 2016). Sofia Ledberg, in her 2014 dissertation, noted that the role of the military is neglected in general public administration literature as well as for its role in China's political reform and development. Sofia Knöchel Ledberg. Governing the Military: Professional Autonomy in the Chinese People's Liberation Army (Ph.D. dissertation, Uppsala University, 2014), p. 13.

260 The data for military expenditure is from SIPRI and for nuclear warheads from the Federation of American Scientists Nuclear Notebook. Jacob Heim & Benjamin Miller. *Measuring Power; Power Cycles, and the Risk of Great-power War in the 21st Century* (Santa Monica: RAND Corporation, 2020).

261 Eric Heginbotham, et al. (eds). *The U.S.—China Military Scorecard: Forces, Geography, and the Evolving Balance of Power 1996–2017* (Santa Monica: RAND Corporation, 2015).

262 Per Olsson. *Defence Economic Outlook 2023: An Assessment of Military Strength among Major Global Powers 2000–2030*. FOI-R--5433--SE (Stockholm: Swedish Defense Research Agency, 2023), p. 10.

263 Paul Bracken. Net Assessment: A Practical Guide. *Parameters* 36: 1 (2006). https://press.armywarcollege.edu/parameters/vol36/iss1/1/.

264 Kitchen. Making Net Assessment Work, p, 57.

industrial development, and global norms and international relations."[265]

Such a broad perspective allows for several different quantitative as well as qualitative methods to analyse various aspects of military power. For example, textual analysis can be used to analyse military doctrines, while satellite image data can be used to assess military infrastructure. Similarly, a recent RAND study developed a method for analysing countries' defence-industrial base by combining six topics: economics; governance and regulations; research, development, and innovation; workforce, labour, and skills; manufacturing; and raw materials.[266]

The challenges of assessing the actual fighting power of a nation became apparent following Russia's full-scale invasion of Ukraine in February 2022. In a self-reflective report on why Russia's capability had been overestimated, the authors' of FOI's *Russian Military Capability* note that one reason for the overestimation was that intangibles had previously been excluded, which partly explained why the outcome of the invasion differed from what was expected. These intangibles include "soldier morale, corruption and cheating, leadership, and conducting offensive operations on foreign soil (as opposed to defending the motherland)."[267] There is reason to assume that similar intangible aspects, such as morale and corruption, are equally important when analysing China's military power, although they are notoriously difficult to assess. The theoretical framework presented in this study is designed to take into account both tangible and intangible factors.

Cases and context

An assessment of a nation's military power will vary depending on the context. Power to do what? The answer will be different if the aim is to defend the country from an attack by a major power or if it is to assess the power to fight a border war with a weak opponent. Similarly, different methods are more suitable for studying specific cases than for analysing overall capacity. In the case of China, much of the Chinese military's focus is concentrated on planning for a possible military conflict contingency in the Taiwan Strait, while far fewer resources are directed towards China's overseas power projection.

Scenarios and wargaming are popular methods used to assess specific conflict cases and are increasingly used by security and military analysts. A possible Chinese invasion of Taiwan has figured in innumerable war games with various outcomes. For example, CSIS conducted a war game in 2023 that gained much attention. The scenario was run 24 times, and in most cases, US/Taiwan/Japan forces defeated the PLA and managed to maintain an autonomous Taiwan, but at a very high cost in casualities as well as to Taiwan's economy.[268] The large number of Taiwan war games has also made it possible to conduct meta-studies analysing a large number of studies. Recently, the Centre for International Maritime Security (CIMSEC) analysed 12 US-based war-game studies of a Chinese invasion of Taiwan conducted between 2016 and 2023.[269]

Methodologies used to study events and particular cases can be useful for understanding a nations' use of military power on a case-by-case basis. Backcasting, for example, is a method sometimes used in connection with wargaming. In backcasting, a hypothetical desired or undesired outcome is traced backwards in time to construct a plausible causal chain of events and the prerequisites required for that outcome to occur.[270] In that sense, such methods can serve as inputs to the overall assessment of military power. However, a general assessment of a country's military power must also take into account many other input factors.

A comprehensive study of military power requires a mixed-methods research approach, combining different

265 Westerlund & Oxenstierna. *Russian Military Capability*.

266 Courtney Weinbaum, Caolionn O'Connell, Steven W. Popper, M. Scott Bond, Hannah Jane Byrne, Christian Curriden, Gregory Weider Fauerbach, Sale Lilly, Jared Mondschein & Jon Schmid. *Assessing Strengths and Vulnerabilities of China's Defense Industrial Base: With a Repeatable Methodology for Other Countries* (Santa Monica: RAND Corporation, 2022).

267 Johan Norberg & Jonas Kjellén. And Now What? Reflections on Assessing Russia's Future Military Capability. In Maria Engqvist (ed.), *Russian Military Capabilities at War: Reflections on Methodology and Sources Post-2022* FOI-R--5502--SE (Stockholm: Swedish Defense Research Agency, 2024), p. 14.

268 Mark F. Cancian, Matthew Cancian, & Eric Heginbotham. *The First Battle of the Next War: Wargaming a Chinese Invasion of Taiwan* (CSIS, 2023). *https://www.csis.org/analysis/first-battle-next-war-wargaming-chinese-invasion-taiwan*.

269 Robert Kitchen. *Red Dragon Rising? Insights from a Decade of China Conflict Studies and Wargames* (CIMSEC, 28 February 2024). *https://cimsec.org/red-dragon-rising-insights-from-a-decade-of-wargames/*. Another example of a meta study was conducted by the Swedish National China Centre, which reviewed 20 forecasts and scenarios on the Taiwan conflict, many of them based on wargames, from 2013 to 2023. Alexis von Sydow. *Is a conflict over Taiwan drawing near? A review of available forecasts and scenarios* (Stockholm: Swedish National China Centre, Brief No. 1, 2024). *https://kinacentrum.se/en/publications/is-a-conflict-over-taiwan-drawing-near-a-review-of-available-forecasts-and-scenarios/*.

270 Simon Elias Bibri. Backcasting in futures studies: A synthesized scholarly and planning approach to strategic smart sustainable city development. *European Journal of Futures Research* 6:13 (2018), p. 10.

qualitative and quantitative data-collection methods. For example, in the study of military doctrine (the conditional factors block), textual analysis is a valuable method, while the study of the military industrial base (the resources block) may require the analysis of public procurement data.

4.1 Methods for the study of China's military power

When discussing methods and sources for analysing China's military power, we should first reiterate that our approach to military power is broad. This means that our analytical framework includes factors related to, for example, security policies, governance, and international relations, and not only those more specifically related to the PLA. Therefore, this section includes sources that reflect this broad approach.[271]

Due to China's closed political system and lack of transparency, particularly regarding military issues, some of the research methods used to study Western militaries, such as interviews with key decision-makers, are not suitable or possible in the Chinese context. Moreover, access to data has varied over time, depending on China's domestic and international political climate, as well as on the emergence of new technologies.[272] The internet opened up easier access to online information about Chinese military issues that had previously been either impossible or at least difficult to retrieve. As Evan Medeiros noted in 2003: "The growth of information about the Chinese military stands in stark contrast to the research difficulties stemming from a paucity of usable information over a decade ago."[273] However, Chinese authorities were less enthusiastic about foreigners increasing access to information on politically sensitive issues, particularly concerning the PLA. In recent years, access to information has become more restricted, especially for observers outside China. Much of the information that was previously available online has disappeared.[274]

More recently, Taylor Fravel, in his 2019 book, *Active Defense: China's Military Strategy Since 1949*, notes that there is "increasing availability of Chinese language materials about the PLA."[275] This stands in contrast to more recent experiences of declining access to military sources. Fravel's book is based on an analysis of all of China's nine adopted strategic guidelines since 1949. These guidelines provide authoritative guidance from the CMC "for the operational doctrine, force structure, and training of the PLA."[276] Fravel notes that, with regard to the more recent strategic guidelines of 2004 and 2014, compared to the older ones, far less documentary evidence is available, as material has not yet been compiled.[277]

Because the Chinese censorship apparatus cannot fully cover all information on the Chinese internet, some data of value can still be found. Local governments sometimes provide valuable information, such as complaint portals where citizens can report local problems.[278] Similarly, individual companies' webpages can be of use. For instance, in investigating China's defence industry, the author of Chapter 6 in this report found the financial analysis of Chinese investment companies to be particularly useful.

Another source of information is government procurement documents, which have been used to locate and identify Uighur internment camps in Xinjiang, as well as patent filings that have provided insight into the surveillance state.[279] However, the 2021 data security law restricted overseas access to information involving corporate registration, patents, procurement documents, academic journals, and official statistical yearbooks.[280]

271 This section, and more broadly the design of our analytical framework, benefitted tremendously from conversations with experienced observers of the Chinese military from the U.S., Europe, and Taiwan during 2023–2024.

272 Previous works involving methodology and sources for the study of the PLA include Mulvenon & Yang. *A Poverty of Riches*; and Mattis. *Analyzing the Chinese Military*.

273 Evan Medeiros. Undressing the Dragon: Researching the PLA through Open Source Exploitation. Chapter 4 in Mulvenon & Yang. *A Poverty of Riches*.

274 The increasing difficulty of gaining access to Chinese online sources in recent years, in particular related to military and security issues, has been confirmed in numerous dialogues with other China scholars around the world. See, also, Vincent Brussee & Kai Von Carnap. The Increasing Challenge of Obtaining Information from Xi's China (Merics. February 2024). *https://merics.org/en/report/increasing-challenge-obtaining-information-xis-china*; Jonah Victor. China's Thickening Information Fog: Overcoming New Challenges in Analysis. *Studies in Intelligence* 68:3 (September 2024).

275 Fravel. *Active Defense*, p. 37.

276 Ibid., p. 1.

277 Ibid., p. 217.

278 Katrina Northorp. Open Source. *The Wire* (January 16 2022). *https://www.thewirechina.com/2022/01/16/open-source/*.

279 Ibid.

280 Victor. China's Thickening Information Fog: p. 38.

Interviews

Interviews can be a powerful source of information and have long been widely used in China studies. However, it has become more difficult over the years to gain access to interviews on sensitive subjects, especially for foreign scholars. Based on one of the author's experiences of conducting fieldwork in China on and off between 2000 and 2018, starting in the mid-2000s, it became progressively more difficult to persuade Chinese officials to give interviews to foreigners. There are several reasons for this change. Westerners were no longer seen as particularly interesting, as China had become increasingly wealthy and foreigners were more common in China, diminishing the novelty of meeting foreigners and the status associated with them had diminished. However, the main reason was that the authorities began to more strictly regulate officials' contact with foreign scholars. This change in attitude towards foreign scholars coincided with a shift in the leadership's stance on political reform and political participation such as village elections. It was also around this time that many of the local election innovations were finally abandoned following a changing attitude from the Party centre.[281] Nevertheless, while more challenging than previously, it remained possible to conduct interviews for many years. Following Xi Jinping's ascent to power in 2012, however, conditions for interview-based research deteriorated significantly, step-by-step, becoming markedly more difficult from Xi's second term (2017) onwards.[282]

When it comes to the Chinese military, interviews have always been more sensitive than in most other areas in society.[283] Currently, even interviews with Chinese scholars are far more difficult to arrange, and even fewer are willing to speak out. Since 2016, academics have been required to obtain university approval for overseas trips and collaborations, and since 2020 these rules have also applied to online events held by international organisations, effectively preventing many PRC scholars from attending.[284] However, it may still be possible to interview Chinese experts or practitioners who reside outside China. As Taiyi Sun writes, "Given China's presence in the world today, Chinese officials, scholars, employees of Chinese state-owned enterprises [SOEs] can be accessed virtually everywhere in the world."[285] In addition, interviews with non-Chinese experts on Chinese military issues, or with practitioners and military personnel who have experience working directly with the PLA, can be of great value. Other valuable sources include policymakers or government officials who have dealt with, or are dealing with, Chinese counterparts in either bilateral settings or multilateral forums, such as security and military-related bodies within the United Nations.

Another possible source of information is Chinese students abroad, although this raises a number of ethical and methodological challenges. In addition, the number of Chinese overseas students is steadily decreasing. Student's may be able to provide some insights into attitudes and sentiments among segments of the Chinese population. For instance, as a way of analysing the PLA's status within Chinese society, one might ask how they assess the likelihood that their classmates in China would be willing to join the military.

Textual analysis

Analysing written material is one of the available research methods to study China's military power. There are numerous methods within the broad category of textual analysis such as discourse analysis, frame analysis, policy analysis, and content analysis, which can all be used to study different angles of China's military power. In relation to the analytical framework presented in Chapter 2, these methods are particularly suited for the study of the second and third block: perceptual inputs and conditional factors. For instance, discourse analysis or frame analysis can be used to analyse changes in Chinese military doctrine or the overall security policy. Content analysis can be used to track the prevalence of specific words and concepts in party or government reports or policy documents such as the Defence White

281 Oscar Almén. "Local participatory innovations and experts as political entrepreneurs: The case of China's democracy consultants," *Democratization* 23:3 (2016): pp. 478–497.

282 For further insight into the increasing difficulty of conducting fieldwork and interviews in China, especially since Xi Jinping came to power, see Tyler Harlan, State of Sensitivity: Navigating Fieldwork in an Increasingly Authoritarian China. *Made in China Journal* (October 25, 2019) *https://madeinchinajournal.com/2019/10/25/state-of-sensitivity-navigating-fieldwork-in-an-increasingly-authoritarian-china/*.

283 See Ledberg, Governing the Military, pp.76–88 for an excellent discussion on interviewing Chinese military officers.

284 Victor. China's Thickening Information Fog, p. 37.

285 Taiyi Sun. *Disruptions as Opportunities: Governing Chinese Society with Interactive Authoritarianism* (Ann Arbor: University of Michigan Press, 2023), pp. 203–204. For more tips and creative solutions in doing fieldwork in China, I highly recommend reading the appendix, "Eight Useful Tips for Conducting Fieldwork in China," in Sun's book.

Paper (see official sources below) that may indicate a change of focus over time.

As in any cultural context, language and cultural competence are key aspects for interpreting and analysing data on China's military. Concepts that have a certain meaning in a Western military tradition may carry different connotations in the Chinese tradition. In the case of China, the political dimension makes interpreting information even more challenging. Communist political jargon intentionally uses symbolic and indirect ways to communicate messages that are first and foremost directed towards Party members and their own citizens. For outsiders not brought up in the Chinese political landscape, successfully interpreting the messages requires long training and exposure.

There are different techniques to analyse Chinese official documents in order to get as much out of them as possible. Major speeches of Chinese leaders can be analysed over time in order to identify small changes and nuances that might indicate important policy changes. Special attention should be given to sections starting with "there are some problems" as these may contain the most relevant information. It is also important to pay attention to what is *not* mentioned, as this will often be as informative as what *is* mentioned.[286]

Other issues to take into account when analysing China's military include what the Chinese military wants us to see. What the PLA shows the outside world, in for example military parades or exhibitions, is always the best equipment, but that is not representative of the whole of the PLA. The same is true for many official publications such as white papers, government statements, and *People's Daily* editorials. These are partly directed towards the outside world, which affects both tone and content of the publication.

Open source intelligence

Access to data has always been a challenge in the study of war and military issues around the world. New technology has opened up a range of new opportunities to study even security-sensitive subjects. Open source intelligence (OSINT) has become a research field in itself and has led to a plethora of commercial actors offering data and analysis services. The Ukraine war has shown the increasing value of informal sources such as satellite imaging, social media, and analytical nodes such as Bellingcat and the Conflict Intelligence Team (CIT).[287] Experiences from other regions and cases, such as the war in Ukraine, can be useful when exploring methods to research the Chinese military.

Satellite-image data analysis

Due to increased availability to satellite data, the use of remote sensing data has in recent years become a popular research method to "assess military situations and monitor conflicts on and off the frontline."[288] The method has become broadly available as there are today a number of open-access space-borne remote sensing sources, such as Earth Explorer (*https://earthexplorer.usgs.gov/*) and more geographically specific platforms such as Deepstatemap (*https://deepstatemap.live/*), which covers Russian troops in Ukraine. Swedish authorities have access to the European Space Agency (ESA) service Pléiades (*https://earth.esa.int/eogateway/missions/pleiades*).

In addition to open access data, there are a wide range of private companies offering access to satellite data for a fee. This opens up possibilities for more advanced and detailed technology. One such example that has been tested by FOI is the US-based Planet (planet.com). Satellite imagery has been found to be of great value for identifying and revealing sensitive military equipment and infrastructure. In the Chinese case, satellite imagery has, for instance, been used to identify nuclear weapon silos and military infrastructure buildup along the Sino-Indian border as well as in the South China Sea.[289] CSIS has also conducted several studies related to the Chinese military using satellite imagery in their *Hidden Reach* series.[290]

4.2 Sources for studying Chinese military power

Before discussing how to find and interpret the difficult terrain of Chinese sources, it is relevant to first mention a number of non-Chinese sources that should

286 Charles Parton. *China watching in the "New Era": A guide, explainer* (Council on Geostrategy, February 2022), p. 7.

287 Maria Engqvist (ed.*), Russian Military Capabilities at War: Reflections on Methodology and Sources Post-2022*. FOI-R--5502--SE (Stockholm: Swedish Defense Research Agency, 2024).

288 Hang Xu, Sylvain Barbot, & Teng Wang. Remote sensing through the fog of war: Infrastructure damage and environmental change during the Russian–Ukrainian conflict revealed by open-access data. *Natural Hazards Research*. 4 (2024): p. 1.

289 Katrina Northorp. Open Source. *The Wire* (16 January 16 2022). *https://www.thewirechina.com/2022/01/16/open-source/.*

290 CSIS, Hidden Reach, *https://www.csis.org/programs/hidden-reach*. (Accessed 25-03-27).

constitute a basis for further research. Some of these are mentioned in Chapter 3, as they can be seen both as part of previous research and as secondary or even primary sources depending on what they are used for. A number of authoritative institutions continuously publish statistics and other information on issues that are crucial for assessing military power. Two key sources here are the Stockholm International Peace Research Institute (SIPRI) for data on military expenditure and the International Institute for Strategic Studies (IISS) for data on military equipment.[291] Chapter 5 of this report draws extensively from these two sources. Another important source of information is the US Department of Defense's annual report to Congress on *Military and Security Developments Involving the People's Republic of China,* which assesses the PRC's and the PLA's "current capabilities and activities, as well as its future modernization goals."[292] China's neighbours, such as Japan, India, and Taiwan, regularly publish information on PLA activities in territorially contested areas. Japan's Ministry of Foreign Affairs publishes data on Chinese maritime activities around the Senkaku/Diaoyutai islands.[293] In Taiwan, the Ministry of National Defense Republic of China (MND, 中華民國國防部) publishes the PLA's activities in the waters and airspace around Taiwan on a daily basis. Until recently, the MND publications were more detailed in terms of flight path operations and types of aircrafts tracked in the Taiwan Air Defense Identification Zone (ADIZ). The MND now discloses the number of aircraft and ships, as well as the general area where they are operating. Occasionally, the MND also produces a *Chinese Communist Military Power Report* (中共軍力報告書). It is a low-profile product that is not published on its website, however, making it difficult but not impossible to obtain copies of.[294]

Despite the reduced availability of Chinese data in recent years, there are still plenty of materials that can be used, including political leaders' and high-ranking military officials' statements, Party and government documents such as the Defence White Paper, media, and academic periodicals and books. Many of the publications from RAND on Chinese military and security issues are based on Chinese documents. A recent study of Chinese overseas bases was based on "open-source Chinese-language primary source articles by Chinese military-affiliated researchers," including PLA scholars.[295] Other more indirect sources can be bilateral agreements with foreign nations' militaries, meeting notes from working group settings (for instance, in the UN, related to autonomous weapons developments) and other open and official documents where Chinese policymakers or military representatives are engaged.

The next section is an overview of some of the written sources on the Chinese military, or military related issues. It is far from providing full coverage of all sources but can serve as a starting point for where to start searching.[296]

Official documents

A key document for understanding China's official defence and security policy is the Defence White Paper, which is published openly.[297] For a number of years, the Defence White Paper was published biannually, but since 2015 it has appeared less frequently. The last version is from 2019 and is entitled *China's National Defense in the New Era*. The Defence White Paper reveals limited information about the PLA's capabilities. However, it may be useful for gaining a better understanding of defence policies. Comparing different versions of the White Paper may also tell us something about policy changes.[298]

Other state and party documents may, in addition to important general policies, contain defence and security-relevant information. Government reports are accessible from the State Council's policy document library site.[299] The State Council website also provides links to all central ministries' and local governments'

291 SIPRI, Sources and Methods, *https://www.sipri.org/databases/milex/sources-and-methods*. IISS. *The Military Balance 2024*.

292 U.S. Department of Defense. *Military and Security Developments* (2023), p. I.

293 See, for instance, Japan's Ministry of Foreign Affairs: *https://www.mofa.go.jp/files/100647455.pdf*.

294 Taiwan Ministry of National Defence, R.O.C. *https://www.mnd.gov.tw/PublishTable.aspx?Types=%E5%8D%B3%E6%99%82%E8%BB%8D%E4%BA%8B%E5%8B%95%E6%85%8B&title=%E5%9C%8B%E9%98%B2%E6%B6%88%E6%81%AF*

295 Howard Wang and Nathan Beauchamp-Mustafaga. *Not ready for a Fight: Chinese Military Insecurities for Overseas Bases in Wartime* (Santa Monica: RAND Corporation, 2024).

296 Taylor Fravel provides a long list of military news sources and periodicals available online in his overview from 2003. However, many of these are no longer available. Taylor Fravel. The Revolution in Research Affairs: Online Sources and the Study of the PLA. In Mulvenon and Yang. *A Poverty of Riches* (2003).

297 Andrew S. Erickson has collected all of China's Defence White Papers 1995–2019 and made them available for download on this webpage: *https://www.andrewerickson.com/2019/07/china-defense-white-papers-1995-2019-download-complete-set-read-highlights-here/*.

298 Petter Mattis. So You Want to be a PLA Expert? *War on the Rocks* (2 June 2015). *https://warontherocks.com/2015/06/so-you-want-to-be-a-pla-expert/*.

299 国务院政策文件库 [State Council policy document library]. *https://www.gov.cn/zhengce/zhengcewenjianku/*. (Accessed 2015-02-04).

government webpages. All national laws are accessible at the National People's Congress (NPC) website (NPC.gov.cn). The NPC Observer, an independent initiative affiliated with Yale Law School, offers valuable information on the legislative work at the NPC, such as draft laws.[300] The CCP publishes Party opinions, which are important political policy documents that are sometimes precursors to legal changes. The opinions are accessible, together with other CCP reports, at the CCP news website.[301]

Speeches by CCP leaders and high-ranking military officials are one way for the leadership to express official policy and strategic guidelines. Xi Jinping has on occasion used speeches to launch new concepts and ideas. For example, Xi first mentioned One Belt One Road (OBOR), which was later renamed the Belt and Road Initiative (BRI), at a speech at a university in Kazakhstan.[302]As a consequence of Xi Jinping's centralisation of power within the CCP and the political system in general, all opinions expressed publicly are nowadays fully aligned with Xi's position. A high-ranking leader who would express an opinion somewhat contrary to Xi's would not last long in their role as Xi demands absolute loyalty.

Chinese media sources

Media too has become increasingly restricted and censored during Xi Jinping's rule. It is today difficult to find politically relevant investigative journalism in China. 40 percent of China's investigative journalists quit their jobs between 2011 and 2017.[303] However, media can be used as another source for understanding and analysing the Chinese leadership. It is important to heed the words of experienced China watcher Charles Parton to "mind the gap between rhetoric and reality." Much of what is written consists of signalling and influence rather than information.[304]

For military issues, the most relevant media source is PLA Daily (解放军报), which is the mouthpiece of the PLA. The site not only carries the PLA Daily's news, but also contains useful information about military issues and links to military-related institutions such as the Ministry of National Defence, the different services and arms of the PLA, and military-related media such as the China National Defence News (中国国防报), Xinhua's military news, and the monthly China's Militia (中国民兵). Other media also carry military-relevant stories and news. The Sina portal (sina.com.cn) has a site that collects military news from different sources.[305] By using creative ways to examine military issues, relevant information concerning the PLA can also be found in local media outlets and by using a combination of sources. Eric Hundman scanned Chinese media, academic journals, master's theses, and doctoral dissertations through the China National Knowledge Information (CNKI) database (see below) as well as search engines and social media, in search of information about soldiers quitting or refusing to serve in the PLA and came up with 236 individual cases of resistance to service in the PLA occurring between 2009–2018. He concludes that the phenomenon is more common than public reports indicate and that "refusals to serve are a concern for the CCP and PLA as they work to reorganize and improve China's military forces."[306]

The most relevant media sources for information on how the Party-state leadership thinks include People's Daily (人民日报 *http://www.people.com.cn/*), which represents the views of the CCP Central Committee, and Xinhua online (新华网*http://www.news.cn/*), which falls under the State Council. The commercial paper Global Times (环球时报 *https://huanqiu.com/*) draws much attention from foreign observers for its nationalistic content, but although it belongs to the same media group that publishes People's Daily, it does "not represent institutional views".[307] These media also carry military news and information and often contain special sections about military issues. Seek Truth (求是*http://www.qstheory.cn/*) is the Party's theoretical journal, which is useful for understanding the theoretical and ideological foundations of Party policies. It is also occasionally used by leaders to present new thoughts and ideas. Some media, such as China Central Television (CCTV) and official social media accounts, offer imagery of exercises that sometimes can be useful.

300 NPC Observer. https://npcobserver.com/.

301 中央文件[Central Documents]. 中国共产党新闻网[CCP news web]. *http://cpc.people.com.cn/GB/67481/431391/index.html*.

302 PRC State Council, Chronology of China's Belt and Road Initiative. (28 March 2015). https://english.www.gov.cn/news/top_news/2015/04/20/content_281475092566326.htm. (Accessed 2025-01-31).

303 Victor. China's Thickening Information Fog, p.34.

304 Parton. *China watching in the New Era."*

305 Sina 新闻中心. *https://mil.news.sina.com.cn/?from=wap*. (Accessed 2025-05-03).

306 Eric Hundman. Fearing Hardships and fatigue? Refusals to Serve in China's Military, 2009–2018. *Journal of Contemporary China* 32:142 (2023): pp. 559-585.

307 Mattis. *Analyzing the Chinese Military.*

When it comes to all publications, but perhaps especially opinion pieces, careful attention should be given to the position of the author. It is important to ask whether or not the author is a person with authority who with high likelihood can be said to represent institutional interests.

Social media

Social media platforms have been crucial sources of information in many modern conflicts. Much analysis of the Ukraine war is based on microbloggers using platforms such as *Telegram*. The US-based Institute for the Study of War (ISW) extensively uses Russian micro bloggers as sources for front-line developments, but they make a point that the information is used as a basis for interpretation by ISW analysts.[308] In this sense, social media becomes a source of information on military activities. Social media images can also be used to geolocate military activities, often unintendedly revealed by the owner of the account.

Social media has also suffered from increased government control and censorship during Xi Jinping's reign. Weibo is China's largest microblogging platform. Usage and access have become more difficult, such as requiring a Chinese mobile number to create an account, which makes it particularly difficult for foreigners. Despite censorship and other limitations, social media remains a means to gain access to what people in China think. Many individual military enthusiasts' Weibo accounts discuss military issues, including comments from followers. While these discussions tend to be strongly flavoured by nationalist sentiments, they can also point out problems in the PLA. However, by the 2020s, the authorities also restricted what these military-engaged netizens were allowed to discuss.[309]

Some research uses "data-scraping" to conduct quantitative studies.[310] Big Data analysis of social media can be used to, for example, examine the mood, emotions, and perceptions of the Chinese public, including changes over time in terms of nationalist sentiments and support for China's military actions. In a major study based on thousands of posts on public WeChat accounts, Titus Chen examined how China's government uses digital ideological statecraft to manipulate public discourse and shape public opinion via social media.[311]

In addition, social media can be used to find out how the Chinese regime thinks. By registering what posts have been removed by the Chinese authorities, researchers have been able to analyse what Chinese censors, and by extension the Chinese regime, finds to be most sensitive. In a study by King et al. that examined millions of social media posts that had been censored, the researchers found that it was not so much the content of the post that mattered, but to what extent it gained traction and risked collective action. Posts highly critical of the CCP could sometimes remain uncensored, while far less sensitive subjects related to a local protest would be removed.[312] Other studies of Chinese social media have, for example, examined Chinese military thinking on social media manipulation against Taiwan,[313] and PLA information dissemination and propaganda using WeChat.[314]

Academic journals

Analysis from Chinese scholars is one source of information that is still publicly available, at least within some limitations. To what extent these sources can inform us about the PLA and the CCP leadership is not always clear. One important point to keep in mind is that scholars who have real influence and information are far less likely to publish anything in public. Similarly, scholars and experts who appear often in media probably have very limited access to the leadership, as they would not be allowed to express their ideas openly if they had access. Yet, in the words of PLA expert Joel Wuthnow: "Used carefully, however, books, articles, and other written materials, and conversations with those who compose them, can help to interpret official policies, and in some cases can shed light on issues where

308 Institute for the Study of War. *Statement on ISW Methodology* (4 May 4 2023). *https://understandingwar.org/backgrounder/statement-isw-methodology*.

309 Victor. China's Thickening Information Fog: p. 37.

310 Ying Li (et al.). Social effects of topic propagation on Weibo. *Journal of Management Science and Engineering* 7 (2022): pp. 630–48.

311 Titus Chen. *The Making of a Neo-Propaganda State* (Leiden: Brill, 2022).

312 Gary King, Jennifer Pan & Margaret Roberts. *How Censorship in China Allows Government Criticism but Silences Collective Expression*. *American Political Science Review* 107:2 (May 2013): pp. 1–18. *https://tinyurl.com/y35r5qn8*.

313 Nathan Beauchamp-Mustafaga & Jessica Drun. Exploring Chinese Military Thinking on Social Media Manipulation Against Taiwan. *China Brief* 21:7 (April 2021).

314 Wei Huang & Yuan Wang. Military's public relations practice in the social media era: exploring the Chinese military's use of WeChat and public engagement. *Asian Journal of Communication 33*:6 (2023): pp. 592–610.

the CCP has yet to render a verdict or is reconsidering existing policies."[315]

China Knowledge Information Gateway (CNKI; *https://www.cnki.net/index/*) is a Chinese academic journal database that offers full-text articles from a large variety of Chinese academic journals. Access varies depending on subscription. A number of Nordic and Baltic libraries collaborate in the Nordic Baltic Association for Asian Studies (NoBAS) in order to obtain access to Staatsbibliothek zu Berlin's electronic and digital platform for Asia research, CrossAsia.[316] The CrossAsia subscription includes CNKI, Chinamaxx e-books, China's Statistical Yearbooks, and several other sources. CNKI still has numerous technical articles from PLA researchers and some on general issues of strategy and doctrine. Some journals do not offer full-text access, while others are available for online reading. Other journals have either ceased or are no longer available. A recent (January 2025) search found that, for example, the journal *Military Economic Research* (军事经济研究) is only available up until 2013, and *Theoretical Studies on PLA Political Work* (军队正工理论研究), as well as the authoritative *China Military Science* (中国军事科学,)is available until 2017. However, *National Defense Science & Technology* (国防科技) includes access to current issues for online reading. The database offers full-text access to some military journals such as *Defence Industry Conversion in China* (中国军转民), *Journal of Military Transportation* (军事交通学报), and *Contemporary Corps* (当代兵团). However, most military-related journals offer access only to older issues or no full-text access at all, only abstracts.

An alternative database for Chinese periodicals is the Chongqing-based Chinese journals service platform, or Qikan (中文期刊服务平台).[317]Similar to CNKI, access to the articles requires a subscription. Another platform for Chinese academic research is Aisixiang (爱思想 https://www.aisixiang.com/), which is "an aggregator of scholarly writing on a range of topics from top Chinese experts."[318] It provides a great number of short essays on subjects including international relations, economics, and politics. The search function is only available if you provide a Chinese telephone number, which limits ways to scan articles based on particular words or authors. However, the most prevalent authors and topics are listed and can also be accessed without a Chinese telephone number.

Books

Chinese books are available on different platforms. China Maxx e-books (chinamaxx.net) offers subscribers access to e-books for online reading but not downloading. Accessible titles include books on military issues, but they are predominantly older publications. In a recent check (December 2024), we found that the latest publishing year for books on military issues (军事) was 2019.

Interesting books on military issues are still available in bookstores in China. Arguably, the most influential textbook on Chinese military thinking is the *Science of Military Strategy* (战略学). China's most prestigious defence institutes, the PLA's Academy of Military Science (AMS 军事科学院) and the National Defence University (NDU 国防大学), each publish separate editions. The AMS version of *Science of Military Strategy* is coordinated with "a number of important PLA departments."[319] The latest version from AMS was published in 2013.

NDU's latest edition of *Science of Military Strategy* is from 2020.[320] In a review, Wuthnow writes that it is likely that some of the authors of NDU's *Science of Military Strategy* had access to formal Chinese military doctrines and that analysing changes in the strategy over time may "reveal insights into new issues, perspectives, and developments that the leaders of China's professional military education system believe need to be imparted to PLA officers."[321]

There are also popular books by active as well as retired military officers, such as *Unrestricted Warfare* (超限战) by Qiao Liang and Wang Xiaosui, or books by, for example, Dai Xu. However, in contrast to the *Science of*

315 Joel Wuthnow. Deciphering China's Intentions: What Can Open Sources Tell Us? *The Asian Forum* (July 2019). *https://theasanforum.org/deciphering-chinas-intentions-what-can-open-sources-tell-us/#3*.

316 Nordic and Baltic Libraries: Access to Asia, *https://crossasia.org/service/nordic-and-baltic-libraries-access-to-asia/*. (Accessed 25-01-22).

317 中文期刊服务平台 [Chinese journals service platform]. *https://qikan.cqvip.com/index.html?from=Qikan_Evaluation_Index*. (Accessed 2025-02-04).

318 CSIS, Interpret China, Aisixiang. *https://interpret.csis.org/original_source/aisixiang/*. (Accessed 2024-11-13). CSIS's open-source project, Interpret China, provides interpretations on a selected number of articles published on Aisixiang.

319 Mattis. *Analysing the Chinese Military*, p. 11.

320 Mattis. So You Want to Be a PLA Expert? The 2020 version of the book is available here: Xiao Tianliang, et al., eds. *The Science of Military Strategy* (National Defence University Press, 2020). *https://www.airuniversity.af.edu/Portals/10/CASI/documents/Translations/2022-01-26%202020%20Science%20of%20Military%20Strategy.pdf*.

321 Joel Wuthnow. What I Learned From the PLA's Latest Strategy Textbook. *China Brief* 21 :11 (May 25, 2021), p.1.

Military Strategy, these books should not be considered representations of the official PLA line.[322]

If one cannot go to the bookstores, one option is to ask a contact in China to send them, but that would require careful consideration of risks related to sending military books abroad. There are also online bookstores such as Amazon (amazon.cn), Kongfuzi (https://www.kongfz.com/), or Dangdang (https://www.dangdang.com/). Many bookstores do not accept foreign payments, however, which may require the use of a transhipping agent.[323]

Fortunately, although Chinese research on military issues is more difficult to obtain today than ten years ago, some of it is available outside China. For example, the US-based China Aerospace Studies Institute (CASI), through the "In Their Own Words" series, provides translations of many Chinese military sources.[324] They have, among other works, translated the 2020 version of *The Science of Military Strategy*.[325] Another similar resource that publishes original and translated Chinese documents is CSIS's Interpret: China open source project.[326] The project started in 2022 and its library contains official documents and recent academic articles on military issues that are not available via CNKI.[327]

Chinese research institutions

While scholars studying military issues may be based at virtually any university in China, some research institutes stand out as particularly relevant. A number of universities have close connections to the PLA and China's defence industry. Foremost among these are the so-called "seven sons," but many others can be included as well.[328] The defence-related universities that are mainly focused on defence-relevant technology research are discussed separately in the chapter on the Chinese defence industry in this report (Chapter 6), and are therefore not discussed further here. However, much social science research on military and security issues is conducted at other research institutions. When it comes to military strategy and doctrine, the PLA's Academy of Military Science (军事科学院) and the National Defence University (国防大学), which fall under the CMC, are the most prominent research institutions. They also publish much on military science, military tactics, foreign militaries, and military history. Much of what they produce is for internal (内部) consumption only, however, and is difficult to access, especially from outside China. The National University of Defense Technology (国防科学技术大学) is the third of the top institutions for military education and research in China.[329]

The broader research field of international relations (IR), which includes security and military policy issues, has "emerged as a mainstream academic undertaking across the country as a whole."[330] Some of the more prominent IR centres, which also publish their own journals, are the Chinese Academy of Social Sciences (CASS 中国社会科学院), Beijing University, China Foreign Affairs University, Fudan University, and Qinghua University.

Some of the above-mentioned research institutes are also included among the government approved national high-end think tanks. Think tanks have virtually become an industry in China, encompassing more than 1900 that contribute to policy deliberation and promotion.[331] Similar to all actors in China, think tanks have been affected by tighter regulations and a hardened political climate. Whereas previously some think tanks could provide alternatives to the official discourse,

322 戴旭 [Dai Xu]. *C形包围—内忧外患下的中国突围* [*C Shape Encircle, China's Breakthrough with the Internal Concerns and External Dangers*] (北京: 文汇出版社, 2009). Mattis warns against emphasising *Unrestricted Warfare* over *The Science of Military Strategy*, as the former simply represents the opinions of the authors, while the latter represents the Academy of Military Science and was coordinated with important PLA departments. Mattis. *Analyzing the Chinese Military*, pp. 10–11.

323 There are many possible transhipping agents, but one that advertises itself as being able to provide books from Chinese bookstores is CNXtrans (*https://www.cnxtrans.com/*).

324 China Aerospace Studies Institute. *https://www.airuniversity.af.edu/CASI/In-Their-Own-Words/*.

325 Xiao Tianliang, et al., eds*., The Science of Military Strategy* (Washington, DC: National Defence University Press, 2020). https://www.airuniversity.af.edu/Portals/10/CASI/documents/Translations/2022-01-26%202020%20Science%20of%20Military%20Strategy.pdf.

326 CSIS, Interpret China. *https://interpret.csis.org/*.

327 One example is Yan Jiajie & Yu Nanping. The U.S. Starlink Project and Its Implications from the Perspective of International and National Security. *Journal of International Security Studies* (September 2024). *https://interpret.csis.org/translations/the-u-s-starlink-project-and-its-implications-from-the-perspective-of-international-and-national-security/*.

328 The Seven Sons are: Northwestern Polytechnical University, Harbin Engineering University, Beijing Institute of Technology, Harbin Institute of Technology, Beihang University, Nanjing University of Aeronautics and Astronautics, and Nanjing University of Science and Technology. China Defence Universities Tracker (ASPI). *https://unitracker.aspi.org.au/about/*. (Accessed 2024-11-21).

329 Ledberg, *Governing the Military*, pp. 73-74.

330 Shaun Breslin & Ren Xiao. Introduction: China debates its global role. *The Pacific Review* 33:3 (2020), p. 358.

331 Nis Grünberg & Grzegorz Stec. *Whispering Advice, Roaring Praises: The Role of Chinese Think Tanks under Xi Jinping* (Merics, 2024). *https://merics.org/sites/default/files/2024-05/MERICS%20Report%20Whispering%20advice%20roaring%20praises_May%202024_3.pdf*

since 2013 the space for differing opinions has shrunk drastically, especially in sensitive areas such as security politics. Many of the more independent think tanks have been shut down. However, think tank reports are useful for understanding official policy, as one of their roles is to present and amplify Party-state messaging.[332] As for think tanks' actual influence, it is wise to follow the advice of Jean Pierre Cabestan, that "we do need to remain cautious about the true extent of think tanks' influence on foreign- and security-policy decision-making."[333]

The CCP Central Committee has so far approved 29 think tanks as "national high-end think tanks" that work as special advisors to the Party-state.[334] These include military-relevant research institutions such as the Academy of Military Sciences and the National Defence University, already mentioned, but also security-focused institutes such as the China Institute of International Studies (CIIS, 中国国际问题研究院), which is the Ministry of Foreign Affairs' in-house think tank, and the China Institute of Contemporary International Relations (CICIR, 中国现代国际关系研究院), which is supervised by the Ministry of State Security (MSS).[335] Think tanks such as these offer insight into the top leaders' views on the security environment, which is of the conditional factors in our analytical framework.

As Chinese media, think-tank publications, academic publications, and even social media become increasingly censored or self-censored, the challenge to find useful information on military issues increases. This requires new, innovative ideas to find useful data. For example, one possible way to analyse the defence industry is to study stockbroker analyses of companies related to the defence industry. Depending on the analysts' valuation of defence companies, some clues can be found as to how the specific industry is doing.[336]

4.3 Applying the theoretical framework

Clearly, the methods used to study military power have to be adjusted depending on context. For the Chinese context, many of the research methods used to study Western militaries are not suitable. Returning to the analytical framework to study military power presented in Chapter 2, we here present some of the methods that can be used to study the different dimensions of military power. What we refer to in the following table as study factors make up parts of the constitutive blocks for an overall analysis of China's military power. Each study factor may constitute several separate subfactors, which require specific operationalisations and research methods, or a combination of methods, to study. However, the first step would be a thorough examination of available previous research related to the study factor. We want to clarify that we do not expect one single report in the coming report series to conduct separate in-depth research on each study factor, as that would be a herculean project. Instead, separate independent studies

Table 4.1 Analytical framework for analysing military power and suggested methodology

Constitutive block	Study factors	Methodology
Resources	• Economy and military expenditure • Military personnel • Military equipment • Military infrastructure • Defence industry and technology	Statistical methods Qualitative analysis Satellite-image analysis
Perceptual input	• Assessment of international security environment • Perceptions of other states and the military balance • Perceptions of internal domestic context	Textual analysis
Conditional factors	• Geography and structure of international system • Governance • Strategy, doctrine and operational concepts • Organisational effectiveness and training • Alliances and strategic partnerships	IR analysis methods Textual analysis

332 Ibid, p. 10.

333 Jean Pierre Cabestan. China's foreign and security policy institutions and decision-making under Xi Jinping. *The British Journal of Politics and International Relations* 23:2 (2021): pp. 319–336

334 Grünberg and Stec. Whispering Advice.

335 For a list of all 29 approved national key think tanks, see Grünberg and Stec, p. 22.

336 This method was suggested by an experienced PLA analyst.

can be done on each of these study factors in order to, step by step, over a longer period of time, develop the building blocks of the overall analysis.

Different research methods are suitable for different constitutive blocks. The resources block relies to a large extent on quantitative data, but qualitative analysis is also necessary for some parts, such as specific assessments of equipment or analysing the defence industry, as the two empirical chapters in this report show. Moreover, satellite-image analysis can be used to study infrastructure or troop movements.

Material and data for the block of perceptual inputs and some conditional factors can be found in Party-state documents, media, academic research, etc. This opens up possibilities for the use of different forms of textual analysis, such as discourse analysis, frame analysis, policy analysis, or content analysis. For example, the Chinese military's perception of a critical concept such as *national security* could be examined by looking at previous research into this and related concepts, as well as in-depth textual analysis of Chinese academic and policy texts. One way to study *perceptions of other states* could be to examine Chinese war movies or Chinese military video games.[337] Although war movies are a doubtful indicator of how the PLA thinks, they are probably a good way to examine the images and messages that are being portrayed to Chinese soldiers and are also likely to influence them.

Finally, the block of conditional factors includes a broad variety of factors that require different, predominantly qualitative, research methods. One aspect of human capital is the *will to fight*. To what extent are Chinese soldiers ready to sacrifice themselves in a war outside China? How has China's one-child policy affected the risk of losing one's only child in a war? The latter could be examined by comparing reactions to losses in non-war situations, such as natural disasters. In this way, many indicators have been previously assessed in non-military studies, and such assessments can be used as input to our overall analysis of China's military power. For instance, one conditional factor in our analytical framework is *governance*. As mentioned in Chapter 2, the World Bank makes yearly assessments of the governance capability of nations around the world using six governance indicators.[338] The governance capability of the Chinese government is a factor that is likely to affect China's military power. If indicators such as control of corruption or government effectiveness improve or deteriorate over the years, it is likely that this will also somehow affect the PLA and China's military power. A study of corruption in the PLA could include a study of corruption as a phenomenon in China in general, and an empirical mapping of specific corruption cases in the PLA in order to identify possible patterns, such as whether publicised corruption cases are more or less prevalent in certain sections within the PLA.

To sum up: studying China's military power is a challenging task, especially considering the increasing difficulties of finding information in the PRC. This requires creativity and flexibility in the choice of research methods and sources. At the same time, the development of satellite technology and the constant expansion of online open sources have created new opportunities to conduct research. Despite the Chinese government's efforts to censor and limit access to information, as this chapter attempts to show, there is still plenty of information that can help us gain a better understanding of China's military power. We argue for a broad approach to the study of military power and for the use of different combinations of research methods depending on the factor to be studied. Careful consideration must also be given to how to interpret the data we manage to obtain. ■

337 On the use of video games for studying the military, see, for example, Daniel Bos. Critical Methodologies for researching military-themed videogames. Chapter 25 in Williams, et al. *The Routledge Companion to Military Research Methods* (New York: Routledge, 2016).

338 The six governance indicators are: Voice and accountability; Political Stability and Absence of Violence/Terrorism; Government Effectiveness; Regulatory Quality; Rule of Law; and Control of Corruption. World Bank, *https://www.worldbank.org/en/publication/worldwide-governance-indicators*. (Accessed 2024-11-20).

5. The PLA's Force Structure and Equipment

Per Olsson

The two subsequent chapters deal specifically with themes and issues related to material resources. Hence, they constitute study factors in the constitutive block on resources, as devised in our analytical framework.

This chapter describes the PLA as an organisation, including its force structure, equipment, and ongoing modernisation process. The focus is on the resources of the PLA, more specifically the material resources of its four services, namely, the ground forces, navy, air force, and rocket force. Meanwhile, the four supporting arms (aerospace, cyberspace, information, and logistics) are only described briefly. The description is not comparative, but it provides some comparisons as points of reference, mainly with the US and to a much lesser extent Russia, India, and larger European countries. The chapter does not describe the People's Armed Police (PAP) or the Chinese Coast Guard.

The method of this chapter is descriptive and mainly relies on quantitative data. The data on military expenditure comes from the Stockholm International Peace Research Institute (SIPRI) while the data on military equipment quantities comes from the International Institute for Strategic Studies (IISS). Meanwhile, complementary qualitative assessments rely on written sources, such as previous research, government agency reports, and news reports.

Chinese Military Expenditure

In 2023, China spent USD 296 billion on its military in current dollars, according to SIPRI.[339] This amounts to the second highest in the world, after the US.[340] While that amount is still only equivalent to about one-third of US military expenditure – USD 916 billion – it is a near six-fold increase since the year 2000; see Figure 5.1. However, China's military spending as a share of GDP has remained relatively stable since 2000. This means that China's military spending has so far increased in tandem with the country's economic growth.

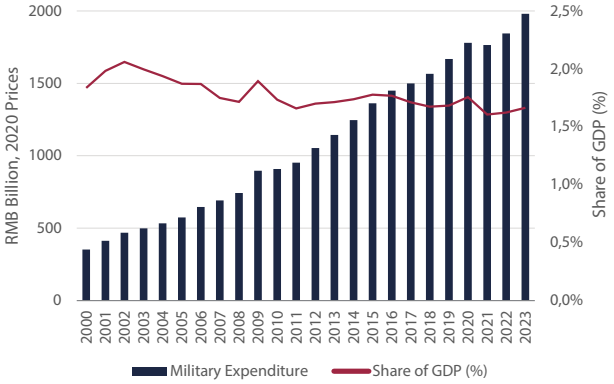


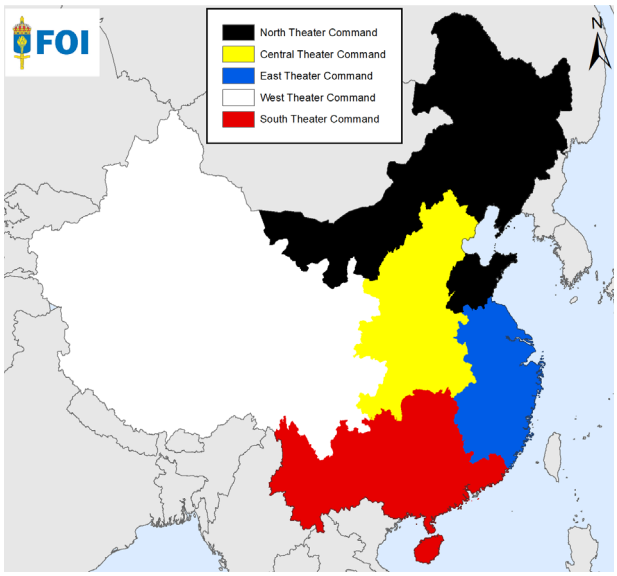
Figure 5.1 China's Military Expenditure. Source: SIPRI (2024), World Bank 2024

Military expenditure measured in USD at market exchange rates (MER) can only tell so much about the resources available to the PLA. For instance, different countries also have different levels of spending power. A certain amount of money often buys more in a developing or emerging economy than in an advanced one. Using purchasing power parity (PPP), spending can be expressed in terms of comparable goods and services between countries. When adjusting for PPP, the US spends about twice as much as China, instead of three times when measured in MER. Given that PPP is not specific to the defence sector, but represents the wider economy as a whole, PPP should not be seen as a more correct measure than USD in terms of MER. However, it does provide an alternative way of comparing military expenditure.[341]

339 Note that SIPRI's numbers for China's military spending differ from official Chinese data. This is because SIPRI not only includes the national defence budget, but also the People's Armed Police, the Coast Guard, payments to retired soldiers, spending on military research, development, testing and evaluation spending, and additional military construction spending; see Nan Tian & Fei Su. *A New Estimate of China's Military Expenditure* (SIPRI, 2021), p. 86. More broadly, the issue of what to account for in China's defence spending is a long-standing issue and is not addressed at length here. For a recent discussion on this theme, see, for instance, Taylor M. Fravel, George J. Gilboy & Eric Heginbotham. Estimating China's Defense Spending: How to get it wrong (and right). *Texas National Security Review* Vol. 7, no. 3 (2024): pp. 41–54.

340 SIPRI. *SIPRI Military Expenditure Database* (SIPRI, 2024).

341 See, for example, Olsson. *Defence Economic Outlook 2023*.



Map 5.1 PLA Military Theatre Commands
Remarks: Map made by Pär Wikström, FOI

PLA Overview

The PLA is the armed wing of the Chinese Communist Party (CCP) and serves as the military force of the People's Republic of China. The PLA consists of over 2,035,000 personnel, making it the largest armed force in the world, in 2024.[342]

During the past two decades, the PLA has undergone a drastic transformation, from a largely land-based force built around massed manpower and large quantities of imported, licenced, or copied Soviet equipment, to a multi-domain and increasingly modern military force with largely indigenously developed equipment. The rapid and comprehensive modernisation of the PLA includes changes in equipment, training, and doctrine. The process has changed the regional and global balance of power. However, China still relies on foreign technology transfers in several areas and still has some ground to cover before catching up to its main strategic rival, the US. For the defence industrial development of China, see Chapter 6.

PLA Organisation

As of 2025, the PLA is organised into four services, including the Ground Force (PLAGF), the Navy (PLAN), the Air Force (PLAAF), and the Rocket Force (PLARF); and four arms, including the Aerospace Force, Cyberspace Force, Information Support Force, and Joint Logistics Support Force.[343]

Geographically, the PLA branches and arms are organised into five Military Theater Commands: the Eastern, Southern, Northern, Western, and Central Military Commands; see Map 5.1.[344] These theatres gather the PLA branches and arms under unified command structures with regional areas of responsibility and aim to create conditions for improved joint operations.[345]

5.1 The People's Liberation Army Ground Force

The People's Liberation Army Ground Force (PLAGF), also known as the People's Liberation Army Army (PLAA), is the second-largest ground force in the world, after the Army of India.[346] Due to China's history and its geostrategic position, the PLA has traditionally been an army-centric force, built around concepts such as the people's war with massed infantry and artillery. During the past decades, however, the PLAGF has steadily reduced the number of active service personnel as the PLA strives to rebalance towards its other branches and transform the ground forces into a mechanised, informatised, and intelligentised fighting force. This includes the introduction of advanced equipment,

342 IISS. *The Military Balance 2024* (IISS, 2024), p. 254.
343 China Military. Chinese PLA embraces a new system of services and arms: Defense spokesperson, *China Military Online*. (19 April 2024). http://www.81.cn/ChinaMilitary/rdxw_208665/16302128.html (Accessed 2024–09–24).
344 Ministry of National Defence. *Theater Commands*. (The People's Republic of China, 2024). http://eng.chinamil.com.cn/VOICES/MinistryofNationalDefense_209794/16302112.html (Accessed 2024–03–27).
345 See, for example, Kenneth Allen, Dennis J. Blasko & John F. Corbett. The PLA's New Organizational Structure: What is Known, Unknown and Speculation (Part 1). *China Brief* Volume 16, issue 3 (Jamestown Foundation, 2016). https://jamestown.org/program/the-plas-new-organizational-structure-what-is-known-unknown-and-speculation-part-1/. (Accessed 2024–08–26).
346 As of 2024, see, for example, IISS. *The Military Balance 2024*, p. 255, 266.

updating ground force doctrine, and reforming the PLAGF organisational structure.

PLAGF Organisation

From the mid-2000s onwards, the PLAGF has moved away from Soviet-style formations of divisions and regiments towards US- and Russia-inspired formations of combined arms brigades and battalions.[347]

In 2024, the PLAGF consisted of 75 combined arms brigades, which consist of three types: armoured or heavy combined arms brigades (33), mechanised infantry or medium combined arms brigade (18), and infantry or light combined arms brigades (24). In addition, the PLAGF has 1 high-altitude mechanised infantry division, 2 independent mechanised infantry regiments, and 3 high-altitude infantry divisions.

The PLAGF also had 15 special operations brigades, 2 air assault brigades, 6 amphibious assault brigades, 15 artillery brigades, 9 engineer/NBC (nuclear, biological, chemical) brigades, 5 engineer brigades, 5 NBC brigades, 1 engineer regiment, 13 support brigades, 19 coastal defence brigades, 1 mixed aviation brigade, 12 helicopter brigades, 4 helicopter training brigades, and 15 air defence brigades. As of 2024, the PLAGF also fields 1 opposing force (OPFOR) armoured brigade, 1 mechanised guards division, 1 security guards division, 16 security border brigades, 15 security border regiments, and 1 security border group.[348]

Geographically, the PLAGF is organised into 13 Group Armies, 2 to 3 per Military Theatre Command.

- The Eastern Military Theatre Command includes the 71st, 72nd, and 73rd group armies.
- The Southern Military Theatre Command includes the 74th and 75th group armies.
- The Western Military Theatre Command includes the 76th and 77th group armies.
- The Northern Military Theatre Command includes the 78th, 79th, and 80th group armies.
- The Central Military Theatre Command includes the 81st, 82nd, and 83rd group armies.

Generally, a PLAGF Group Army contains 1 special operations brigade, around 6 combined arms brigades (as of 2024, between 4 and 7), 1 artillery brigade, 1 air-defence brigade, 1 helicopter or aviation brigade, 1 support brigade, and 1 engineer/NBC brigade; see Figure 5.2.[349]

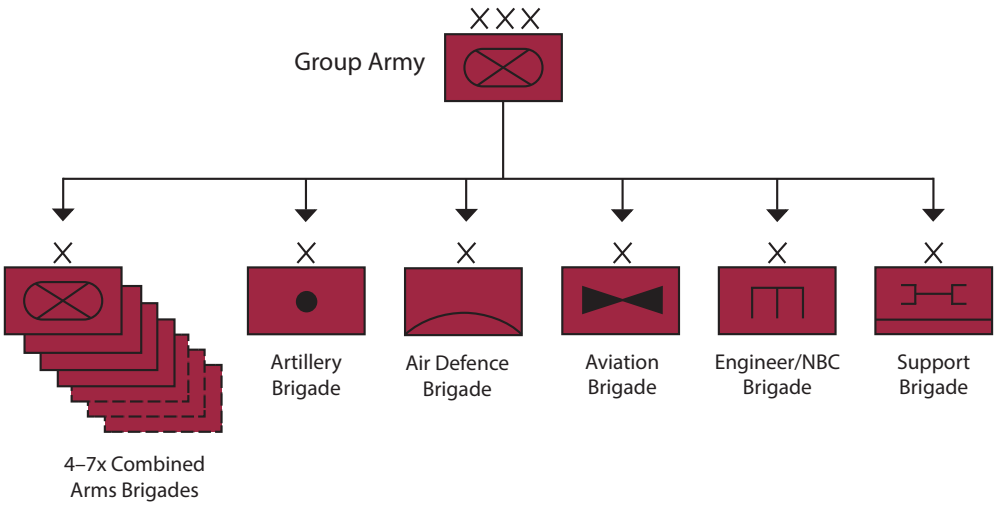


Figure 5.2 PLAGF Group Army. Source: Marvel (2019), Battle Order (2021)
Source: Marvel (2019), Battle Order (2021)

347 Bradley A. Marvel. The Combined Arms Battalion and Combined Arms Brigade: The New Backbone of the Chinese Army. *Red Diamond* Vol. 10, issue 3 (TRADOC, 2019): p. 31.
348 IISS. *The Military Balance 2024*, p. 255.
349 Ibid., pp. 261–263.

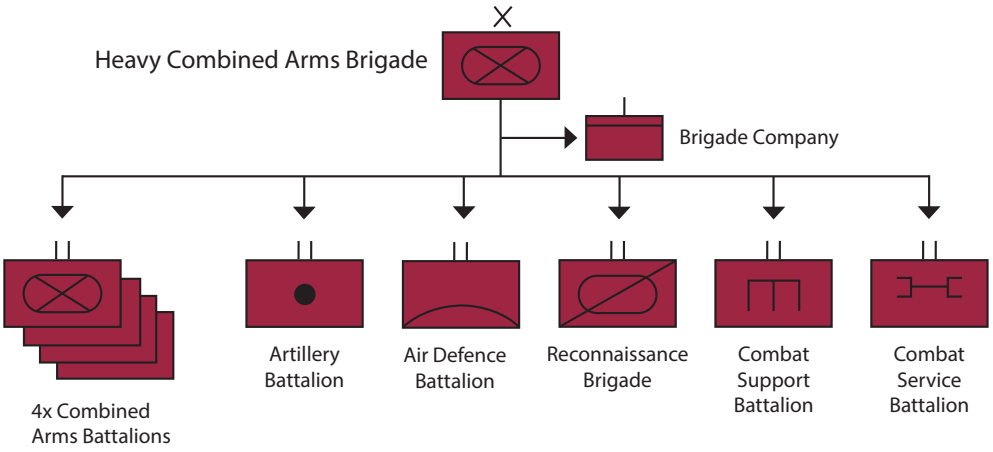


Figure 5.3 PLAGF Heavy Combined Arms Brigade
Source: Marvel (2019), Battle Order (2021)

Currently, a PLAGF armoured or heavy combined arms brigade is similar in role and structure to a US armoured brigade combat team (ABCT), making up the core ground force formation in a given Group Army. A PLAGF heavy combined arms brigade typically consist of 1 brigade command company, 4 combined arms battalions, 1 artillery battalion, 1 air defence battalion, 1 reconnaissance battalion, 1 combat support battalion, 1 combat service battalion, see Figure 5.3.

In terms of equipment, a PLAGF heavy combined arms brigade consists of approximately 120 main battle tanks (MBTs), 136 infantry fighting vehicles (IFVs), 24 mortars, 27 self-propelled howitzers and 6 multiple launch rocket systems (MLRSs), 6 anti-tank missile vehicles, 4 anti-air missile vehicles, 12 anti-air artillery vehicles, as well as reconnaissance vehicles, unmanned aerial vehicles (UAVs), engineering vehicles, mine clearance vehicles, support vehicles, transports, and medical vehicles.[350]

PLAGF Manpower and equipment

In 2024, the PLAGF had 965,000 active personnel, all of which were contracted.[351] In 2024, the PLAGF had 4700 main battle tanks (MBTs), 2450 light tanks, 8050 infantry fighting vehicles (IFVs), 3600 armoured personnel carriers (APCs), 4140 artillery pieces, 1330 multiple launch rocket systems (MLRSs), and 320 attack helicopters in active service.[352] Overall, the PLAGF contains a mix of modern, ageing and obsolete equipment. However, the trend has been a steady pace of upgrades, replacements and new capabilities.

Main battle tanks, 4700 vehicles in 2024

The PLA operates the world's largest active-service tank force, with 4700 in active service as of 2024. Main battle tanks (MBTs) serve as the armoured spearhead and key offensive capability of a heavy or armoured combined arms brigade. MBTs provide direct fire against enemy armoured vehicles, infantry, and structures.

During the past two decades, this force has undergone a rapid modernisation process. Back in 2000, most Chinese MBTs consisted of the obsolete first-generation ZTZ-59. By 2024, about 3800 MBTs, over 80 percent of the PLA's total tank force, consisted of the modern third generation, the same generation as the US M1 Abrams or German Leopard 2s.

These third-generation tanks are armed with a 125 mm main gun, two machine guns, and protected by some combination of explosive reactive armour (ERA), steel, and composite armour. However, 2500 of these consist of the less capable ZTZ-96/-96A, a rough equivalent to the Russian T-72B3M. Meanwhile, 1300 belong to the more advanced ZTZ-99/-99A series. Furthermore, only the 700 ZTZ-99As, the PLA's most modern MBT,

350 Battle Order.*China's New Armored Brigades [Explained]*. (28 February 2021). https://www.youtube.com/watch?v=5d5_65NM1tY. (Accessed 2024–09–30).
351 IISS. *The Military Balance 2024*, p. 255.
352 Ibid., pp. 255–256.

have similar "on paper" performance characteristics as third-generation Western tanks, e.g. the US M1A2 Abrams or German Leopard 2A6.[353]

In 2024, images of a new tank emerged. The exact capabilities of this alleged fourth-generation tank are unknown, but it seems to feature an unmanned turret and advanced active protection systems.[354]

Light tanks, 2450 vehicles in 2024

Light tanks or assault vehicles are typically less armed and armoured compared to MBTs. The main advantage for the PLA with light tanks is that these can be used where terrain or infrastructure is unsuitable for heavier tanks, such as Tibet (Xizang) or Xinjiang. The PLA operates about 2450 light tanks, the most modern of which are the 500 ZTQ-15s. Some of these light tanks, such as the 750 ZTD-05s, are amphibious, which has implications for any scenario involving Taiwan.

Infantry fighting vehicles, 8050 vehicles in 2024

Infantry fighting vehicles (IFVs) are armed and armoured troop transports. Similar to armoured personnel carriers (APCs), IFVs carry infantry armed with automatic carbines, machine guns or anti-armour weapons into battle. However, unlike APCs, IFVs are also equipped with guns or autocannons to support their dismounted infantry during combat. PLA IFVs consist of a large variety of old and new types. The oldest consist of licence-produced copies of the Soviet BMP-1, while the most modern tracked IFVs in PLA service are the 2000 ZBD-04As. Unlike the US Bradley, the ZBD-04A is equipped with a large 100 mm gun besides its 30 mm autocannon, but lacks side-mounted anti-tank missiles (ATGMs). Instead, they rely on smaller ATGMs fired from their gun. Some of China's modern IFVs, such as the 3250 ZBL-08s armed with a 30 mm autocannon, are wheeled.

Armoured personnel carriers (APCs), 3600 vehicles in 2024

Armoured personnel carriers (APCs) are less armed and armoured compared to IFVs. While not designed to engage enemy vehicles, APCs can support infantry with machine guns, while relying on the accompanying infantry for heavier firepower. The PLA operates a large variety of tracked and wheeled APCs, the latter being generally more suited for on-road operations. All modern APCs, such as the 900 ZSL-10s, a machine gun-armed variant of the ZBL-08, are wheeled. The PLA also operates a number of older tracked APCs, such as the 1750 ZSD-89s.

Artillery, 4140 pieces in 2024

The PLA has a long history of fielding large amounts of artillery, adhering to a doctrine similar to the Soviet Union. While the PLA remains a comparatively artillery-heavy force, it has modernised in the past decades. While the PLA's tube artillery still consists of a variety of old and new howitzers, there has been a steady transition from towed to self-propelled pieces. These howitzers are self-propelled in the sense that they are mounted on tracked chassis, such as the 600 PLL-09s and 700 PLZ-07s; or trucks, such as the 630 PCL-181s and 300 PCL-09s. This improvement increases mobility and allows for quick redeployment in order to avoid counter-battery fire. However, the PLA also maintains about 900 towed artillery pieces. The PLA has also developed a long-range rocket artillery system, the PCH-191, which can hit Taiwan from mainland China.

The lighter and shorter-ranged 122 mm howitzers are allocated to battalions within combined arms brigades. These do not have the same range as US 155 mm howitzers, which may help explain the PLA emphasis on mobility. Meanwhile, the heavier and longer-ranged 155 mm artillery is concentrated in separate artillery brigades. These artillery brigades can then be located where they are most needed to support the combined arms brigades.[355]

Rocket Artillery, 1330 pieces in 2024

Rocket artillery typically has longer range, but weaker precision compared to tube artillery. At brigade level, 122 mm rocket artillery is likely responsible for counter-battery fire to compensate for the shorter range of PLA 122 mm tube artillery. Similar to tube artillery, PLA rocket artillery consists of a variety of old and new equipment. The PLA is introducing new rocket artillery platforms, such as the 120 PHZ-11s, while gradually phasing out the older PHZ-89. Similar to tube artillery, the longer-ranged rocket artillery is concentrated in separate artillery brigades. The PLA operates 175 PHL-03s, a Chinese variant of the Russian

353 Olsson. Measuring Quality of Military Equipment.

354 Army Recognition. Is China testing its future 40-ton 4th generation light tank with multiple weapon configurations? (2024b). *https://armyrecognition.com/news/army-news/army-news-2024/is-china-testing-its-future-40-ton-4th-generation-tank-with-multiple-weapon-configurations*. (Accessed 2024–09–30).

355 Battle Order. *New Chinese Artillery vs. U.S. Comparison*, (22 October 2022). https://www.youtube.com/watch?v=FfzbaELw4uY. (Accessed 2024–09–30).

Smerch and has recently introduced its answer to the US HIMARS. In 2024, it operated 60 PHL-16s with a reported 370 mm calibre.[356]

Air-defence systems, over 750 launchers as of 2024

The PLA operates a large variety of anti-air assets. This includes short-ranged anti-aircraft weapons, such as HN-5, FN-6, QW-1, and QW-2 man-portable air-defence systems (MANPAD), modelled after the Soviet Strela and Igla systems. It has anti-air vehicles such as the PGZ-04A, allocated to the PLA combined arms brigades. Short-range vehicle-mounted systems include the Soviet Tor system, the HQ-7, and the more advanced HQ-17 system. Medium range assets consist of the approximately 250 HQ-16s, a derivative of the Russian Buk system. Longer-range air-defence systems, such as HQ-9, are allocated to the PLA Air Force.

Attack Helicopters, 440 units as of 2024

The PLA currently operates three types of attack helicopters, including 200 of the Changhe Z-10, 120 of the Harbin Z-19, and 120 of the Harbin Z-9W. The Z-10 was originally designed by Russian Kamov for the Changhe Aircraft Industries Corporation (CAIC). It is the heavier of the two helicopters, with a maximum take-off weight around 7 tonnes. It is armed with an autocannon and has 4 hardpoints for a number of missiles, rocket pods, bombs, or electronic warfare pods. The Z-10 prototypes were powered by engines produced by a number of foreign companies, among them Pratt and Whitney Canada as well as Russian and Ukrainian manufacturers, before being able to switch to a domestic engine.[357]

The Z-9W, a later version of the Z-9, is a military variant of the license-built Eurocopter Dauphine.[358] The Z-19 is a two-seat combat variant of the Z-9 with two pylons for weapons.[359] In March 2024, online images emerged of a new heavy attack helicopter. This aircraft, called Z-21, would be in the 10-tonne class, compared to the 5.5 tonnes of the much lighter Z-10,[360] putting it more in the same class as the US Apache attack helicopter.

Comparison of the PLAGF with Other Major Powers

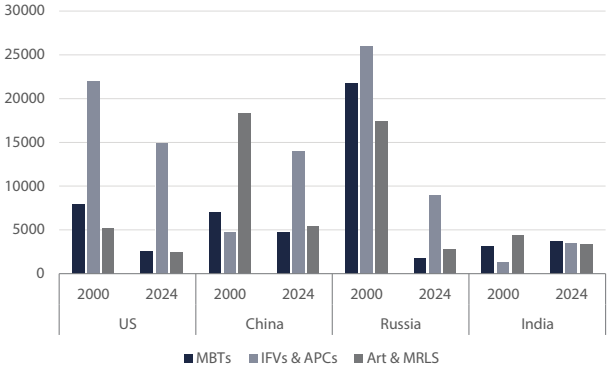


Figure 5.4 Comparison of PLAGF Equipment Quantities
Remarks: Art = Artillery
Source: IISS

Compared to other major world powers, the PLAGF of 2024 is a relatively tank- and artillery-heavy force, especially when compared to the US and other Western armies. This is despite the PLA having reduced its tank and especially artillery numbers drastically during the last decades, as modernisation has traded quantity for quality. Its artillery has undergone the largest shift, from about 15,500 towed artillery pieces, excluding MRLSs, in 2000 to a smaller force of 4140 pieces in 2024, 80 percent of which were self-propelled.[361] Mechanisation has also led to the introduction of a large number of IFVs and APCs, which the PLAGF previously lacked to the same extent as other major powers; see Figure 5.4.

The PLAGF is in the midst of an ongoing modernisation process; with both ageing and modern equipment, the overall trend has been a steady improvement. While most of its equipment may still not be on par with Western army equipment, the gap has become increasingly narrow during the last two decades. The example of shifting generations in MBTs may help to illustrate that point; see Figure 5.5.

356 Ibid.

357 David Donald. Kamov Reveals Involvement in China's Z-10 Attack Helicopter. *AIN* (2013). *https://www.ainonline.com/aviation-news/defense/2013–03–15/kamov-reveals-involvement-chinas-z-10-attack-helicopter* (Accessed 2024–11–13).

358 Weapon Systems. *Harbin Z-9C*. (2024). *https://weaponsystems.net/system/572-Harbin%20Z-9C* (Accessed 2024–11–13).

359 Army Recognition. *WZ-19 Z-19 Harbin*. (2024c). *https://armyrecognition.com/military-products/air/helicopters/attack-helicopters/wz-19-z-19-harbin* (Accessed 2024–11–13).

360 Stefano D'Orso. First Clear Photos Of China's New Z-21 Attack Helicopter (With Striking Resemblance To AH-64). *The Aviationist* (30 March 2024). *https://theaviationist.com/2024/03/30/first-clear-photos-show-chinas-new-z-21-attack-helicopter-and-its-striking-resemblance-to-ah-64/* (Accessed 2024–11–13).

361 IISS. *The Military Balance 2000*. (IISS, 2000); IISS, *The Military Balance 2024.*

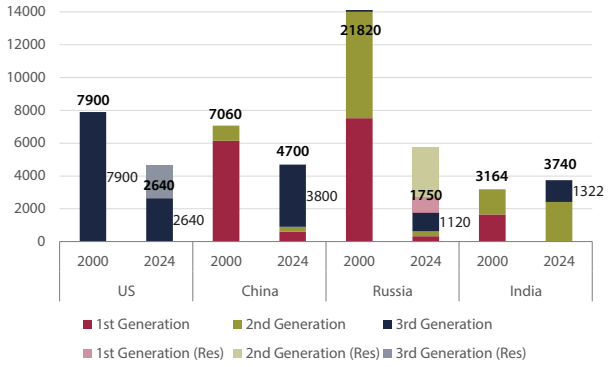


Figure 5.5 Comparison of PLAGF MBT Inventories by Generation

Remarks: Res = Reserves

Source: IISS

The PLAGF currently has the largest number of third-generation tanks in the world. While, as mentioned above, the individual Chinese tank still lags behind its Western counterpart, the PLAGF tank force of 2024 is vastly different from what it was in 2000, having narrowed the capability gap towards the US significantly. The same general picture of narrowing, while not closing, the capability gap towards the West, is true for most equipment types within the PLAGF.

5.2 The People's Liberation Army Navy

During the past two decades, the People's Liberation Army Navy (PLAN) has undergone what is arguably the most comprehensive naval buildup in modern history. In the early 2000s, the PLAN was a largely littoral force with limited capability to project power far beyond the Chinese mainland coast. In 2024, the PLAN has grown to the world's largest navy in terms of number of ships. While the PLAN still focuses on China's near seas, it has increased its presence throughout the Indo-Pacific and beyond.

However, in terms of manpower and tonnage, the PLAN is still far behind its American counterpart, given that the US Navy on average has much larger ships.[362] This can partly be explained by the differing strategic objectives of the US and PLA navies, with the US global presence requiring, on average, larger ships. However, it also indicates a difference in key capabilities, as the PLAN lags behind the US Navy in terms of aircraft carriers, naval aviation, and nuclear submarines.

PLAN Organisation

The PLAN is organised into three fleets: the North Sea Fleet, the East Sea Fleet, and the South Sea Fleet, placed under the Northern, Eastern, and Southern Military Theatre Commands, respectively. As of 2024:

- The North Sea Fleet had 1 aircraft carrier, 4 large destroyers, 12 destroyers, 11 frigates, 10 corvettes, 4 tactical nuclear submarines (SSNs), 15 tactical conventional submarines (SSKs), 18 patrol vessels, 9 mine warfare vessels, and 7 landing ships in its inventory.
- The East Sea Fleet had 16 destroyers, 19 frigates, 19 corvettes, 30 patrol vessels, 9 mine warfare vessels, 1 landing helicopter dock (LHDs), 3 amphibious transport docks (LPDs), 22 landing ships, and 16 SSK.
- The South Sea Fleet had 1 aircraft carrier, 4 large destroyers, 14 destroyers, 15 frigates, 21 corvettes, 30 patrol vessels, 13 mine warfare vessels, 1 LHD, 5 LPD, 21 landing ships, 6 strategic nuclear submarines (SSBNs), 2 SSNs, and 15 SSKs.[363]

PLAN Manpower and equipment

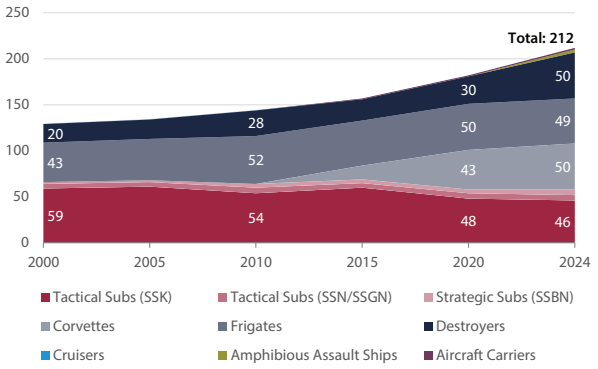


Figure 5.6 Trends in PLAN Surface Combatants and Submarines

Source: IISS

In 2024, the PLAN had 252,000 active personnel, all of whom were contracted.[364] In 2024, the PLAN had 2 aircraft carriers, 8 large destroyers or cruisers, 42 destroyers, 49 frigates, 50 corvettes, 6 SSBNs, 6 SSNs, 46 SSKs, 142 patrol vessels, 40 mine warfare vessels, 3 LHDs,

362 IISS. *The Military Balance 2024*, p. 39, 256. For tonnage see, Olsson. *Defence Economic Outlook 2023*.
363 IISS. *The Military Balance 2024*, pp. 261–262.
364 Ibid., p. 256.

8 LPDs, 50 landing ships, 78 landing craft, and 167 logistics and support vessels in its inventory.[365] Figure 5.6 illustrates the quantitative trends of major surface combatants and submarines within the PLAN.

Of these vessels, over 90 percent have been commissioned into PLAN active service since the year 2000. This makes the PLAN a highly modern navy in terms of newly produced vessels, which contain the latest technology available to China; see Figure 5.7.

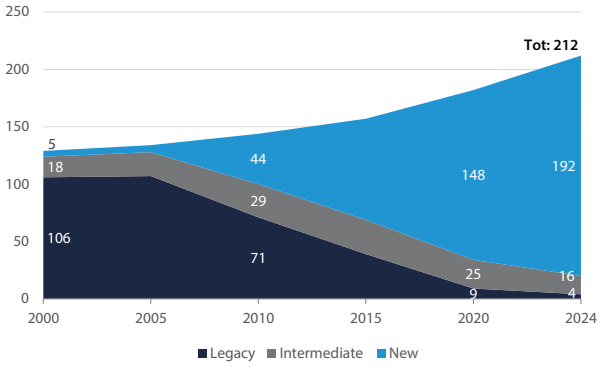


Figure 5.7 Modernity of PLAN Surface Combatants and Submarines
Source: IISS

The PLAN also contains a number of aircraft, organised under the People's Liberation Army Navy Air Force (PLANAF). These aircraft are included in the Air Force section below.

Aircraft Carriers, 2 carriers as of 2024 with 1 additional carrier undergoing sea-trials

Aircraft carriers and their air wings offer power projection capabilities by extending the strike range of a naval formation and form the core of a carrier strike group. However, this also makes them prime targets, which is why carrier groups typically include cruisers, destroyers, and submarines for protection. The offensive capability of aircraft carriers consists of their air wings, comprising fixed-wing combat and/or surveillance aircraft together with rotary-wing anti-submarine, anti-ship, search and rescue, and/or surveillance helicopters.

In 2024, the PLAN operated two aircraft carriers, the *Liaoning* and the *Shandong*. Both of these use a short take-off, barrier-arrested recovery (STOBAR) launch system, meaning that they rely on ski-jump ramps to assist aircraft launches. STOBAR systems limit aircraft launch pace and the payload carried by each aircraft, as well as the types of aircraft that can be launched compared to the catapult-assisted take-off barrier-arrested recovery (CATOBAR) system used on US aircraft carriers.

The PLAN's newest carrier, the *Fujian*, was launched in June 2022 and was undergoing sea-trials as of late 2024. It displaces about 85,000 tonnes and uses a CATOBAR system, powered by electromagnetic catapults.[366] The *Fujian* approaches the capabilities of a 100,000 tonne US supercarrier. However, it is still smaller, and due to its conventionally powered turbines, has limited range and endurance compared to US nuclear-powered carriers.

Having only operated aircraft carriers since 2012, the PLAN's and China's aircraft carrier capability is developing and is still playing catch-up to long time operators, especially the US. However, the PLAN is practicing and introducing new carriers at a steady pace. For instance, it is rumoured that a fourth carrier might be laid down in the near future, and it is further speculated that this carrier might be nuclear-powered.[367]

Amphibious Ships, 11 large and 128 smaller vessels as of 2024

Amphibious ships are designed to carry a large amount of soldiers and military equipment for amphibious landings, as well as a complement of surveillance and anti-submarine warfare (ASW) helicopters to support such a landing. These capabilities make them vital in any potential armed conflict involving Taiwan or the South China Sea. In 2024, the PLAN operated 3 landing

365 Ibid., pp. 256–258.

366 CSIS. How Advanced Is China's Third Aircraft Carrier?" *China Power*. Center for Strategic and International Studies (2024). *https://chinapower.csis.org/china-type-003-fujian-aircraft-carrier/* (Accessed 2024–09–30); Marine Insight. *China's Home-built Aircraft Carrier Fujian Advanced In Cutting-edge Technology* (February 2024).). *https://www.marineinsight.com/shipping-news/chinas-home-build-aircraft-carrier-fujian-advances-in-cutting-edge-technology/* (Accessed 2024–09–30).

367 PLAN Vice-Admiral and political commissar Yuan Huazhi cited "an announcement soon" with regard to a fourth aircraft carrier; see Kyle Mizokami. China Confirms It's Building a 4th Aircraft Carrier—And the Tables Are Turning, *Popular Mechanics* (12 March 2024). *https://www.popularmechanics.com/military/navy-ships/a60116121/china-building-a-4th-aircraft-carrier/* (Accessed 2024–09–30).

helicopter docks (LHDs), 8 landing platform docks (LPDs), 28 landing ships, tank (LSTs), 22 landing ships, medium (LSMs), 11 landing craft, utilities (LCUs), 21 landing craft, mechanised (LCMs), as well as 46 landing craft, air cushion (LCACs) hovercraft.[368]

LHDs are the largest types of amphibious assault ships. In 2024, the PLAN had 3 Type 075 LHDs in active service, each capable of carrying up to 30 helicopters, 1000 soldiers, 35 amphibious vehicles, and 3 hovercraft.[369] Meanwhile, the smaller LPDs can carry up to 4 helicopters, 4 hovercraft, a number of amphibious vehicles, and 900 soldiers.[370] Together with the smaller landing craft, which can carry about 250 soldiers each, the combined one-way transport capacity is about 23,000 soldiers. This means that an initial amphibious landing relying on PLAN amphibious ships alone would likely be insufficient against any nation-sized opponent, e.g. Taiwan. For such an operation, the PLA would have to supplement its own forces with Coast Guard and civilian shipping.

Destroyers, 50 vessels as of 2024

Destroyers are large and heavily armed principal surface combatants, providing air-defence, anti-ship, and anti-submarine capabilities. They can act as protection for aircraft carriers or amphibious assault ships in a carrier group or task force. Destroyers can also act as lead ships in a squadron or act independently in naval operations.

The PLAN operates mostly modern destroyers, but also a number of older designs with relatively limited capabilities. This exemplifies the PLAN's gradual approach to modernisation. Since the early 2000s, the PLAN has introduced several limited destroyer classes with incremental improvements between each generation, before deciding on mature designs for mass production, such as the 25 Type 052Ds and 8 Type 055 large destroyers.[371]

The Type 055s are the PLAN's largest and most advanced destroyers. These are multirole naval vessels, capable of anti-air, anti-ship, and anti-submarine operations with a stealthy hull design and integrated dual-radar mast. The Type 055 displaces 13,000 tonnes and is equipped with 112 vertical-launch system (VLS) cells,[372] making them larger and more heavily armed than the US *Arleigh Burke*-class destroyers with 9600 tonnes and 96 VLS cells. The Type 052D destroyers are smaller, displacing 7500 tonnes with 64 VLS cells,[373] but feature much of the same armament and multirole capabilities as the Type 055.

Frigates, 49 vessels as of 2024

Frigates are mid-sized and well-armed principal surface combatants, providing air-defence, anti-ship, and anti-submarine capabilities. They can take part in a squadron or act independently on patrols. Frigates can act as protection for aircraft carriers or amphibious assault ships, although they are lightly armed and less capable when compared to destroyers. The most common modern PLAN frigates are the 39 Type 054As, which are capable of coastal patrolling as well as blue water operations. These frigates provide the PLAN with a relatively inexpensive workhorse. For instance, the Type 054As have been routinely dispatched on anti-pirate operations in the Gulf of Aden.[374] A new frigate, the Type 054B, has recently been launched. It is substantially larger and likely more capable than previous frigate classes.[375]

Corvettes, 50 vessels as of 2024

Corvettes, or light frigates as they are called in the PLAN, are mainly designed for operations in littoral waters or within the First Island Chain. First introduced in 2012, as of 2024, the PLAN operates 50 Type 056s and Type 56A corvettes. While lacking the anti-air capabilities of

368 *The Military Balance 2024*. (IISS, 2024), p. 258.

369 Weapon Systems. *Type-075 class* (2024). *https://weaponsystems.net/system/1373-Type-075%20class* (Accessed 2024–09–30).

370 Seaforces. *Type 071 Yuzhao-class Landing Ship Dock—LSD* (2024). *https://www.seaforces.org/marint/China-Navy-PLAN/Amphibious/Type-071-Yuzhao-class.htm* (Accessed 2024–09–30).

371 The Type 055 is sometimes referred to as a cruiser due to its large size, with a displacement of around 13,000 tonnes, an armament of 112 vertical launch-system cells, and its potential role as a lead ship. However, China still classifies it as a destroyer, and there are no international standards that clearly distinguish between destroyers and cruisers.

372 Eric Wertheim. Type 055 Renhai-class Cruiser: China's Premier Surface Combatant. *Proceedings* (U.S. Naval Institute) Vol. 149/3/1,441 (March 2024). *https://www.usni.org/magazines/proceedings/2023/march/type-055-renhai-class-cruiser-chinas-premier-surface-combatant* (Accessed 2024–09–30).

373 Eric Wertheim. China's Luyang III/Type 052D Destroyer Is a Potent Adversary. *Proceedings* (U.S. Naval Institute). Vol. 146/1/1,403 (2020). *https://www.usni.org/magazines/proceedings/2020/january/chinas-luyang-iiitype-052d-destroyer-potent-adversary* (Accessed 2024–09–30).

374 Lee Willett. China's Jiangkai frigate roll-out delivers global reach. *Armada International* (18 April 2019). *https://www.armadainternational.com/2019/04/chinas-jiangkai-frigate-roll-out-delivers-global-reach/* (Accessed 2024–10–02).

375 Alex Luck. Chinese Navy Next Generation Frigate Starts Builder Trials. *Naval News* (19 January 2024). *https://www.navalnews.com/naval-news/2024/01/chinese-navy-next-generation-frigate-starts-builder-trials/* (Accessed 2024–10–02).

the Type 054A frigates, they still provide anti-ship and anti-submarine capabilities in large volumes.

Attack Craft, Mine Warfare and Patrol Vessels, 182 vessels as of 2024

In 2024, the PLAN operated a large number of smaller attack vessels, such as the about 60 Type 22 missile attack craft armed with anti-ship missiles. It also operates 82 less modern attack craft or less well-armed patrol vessels. In addition, the PLAN operated 40 mine warfare vessels, including mine-laying and mine-countermeasure vessels.

Strategic Nuclear Submarines, 6 boats as of 2024

Armed with ballistic nuclear weapons, the PLA's strategic nuclear submarines (SSBNs) constitute a key component of China's second-strike capability. China currently operates six Type 094 Jin Class SSBNs, all allocated to the South Sea Fleet operating from Hainan Island. These carry the JL-2 ballistic nuclear-capable missile, which has a stated maximum range of 9000 kilometres. This is enough to reach Hawaii from waters close to China, but not the continental US. For the Type 094s to get in range, they would have to travel far out into the Pacific Ocean, which poses a problem for China as the Type 094 reportedly generates too much noise for a modern SSBN, which makes them less than ideal as a credible deterrent. The addition of the JL-3, expected to carry multiple warheads and longer range, would improve operational capabilities and add lethality, but still does not address the overall capability gap of these submarines. According to the US DoD, China's SSBNs now conduct near-continuous at-sea deterrence patrols.[376]

A new Chinese class of SSBNs are reportedly in development, called the Type 096. These are likely to address some of the shortcomings of their predecessors.[377] On the other hand, the US is replacing its Ohio-class SSBNs with state-of-the-art Columbia Class submarines, building upon its previous experience to maintain their technological lead.

Tactical Nuclear Submarines, 6 boats as of 2024

The PLAN operates the Type 093 Shang Class nuclear attack submarines (SSNs). With 6 in its inventory, the PLAN operates far fewer such vessels than its US counterpart, which has 52. In addition, US nuclear-attack submarines are cutting-edge, unlike the Type 093. In terms of noise, the type is several generations behind the US Virginia-class SSNs.[378] This is a crucial drawback for a submarine that is meant to travel great distances and sneak up on enemies.

A new generation of SSNs, the Type 095, is under development. These will likely be a major improvement compared to their predecessor. While these may still not be as capable as the most modern US SSNs, they would still add significant new capabilities to the PLAN, with greater range and endurance. Reports in Western media suggest that China is also developing a small nuclear-attack submarine, the so called Type 41. Reports state that one sank pier-side during outfitting.[379] This is an undeniable setback, which will delay introduction. However, it is unlikely to derail the long-term construction of nuclear-powered attack submarines.

Tactical Conventional Submarines, 46 boats as of 2024

In 2024, the PLAN operated 46 conventional diesel-electric attack submarines (SSK). The most modern of these are the 20 Type 39A/B Yuan Class submarines, featuring air-independent propulsion, which enables longer underwater operations. The PLAN also operated 12 of the somewhat older Type 39 Song-class, as well as 10 Russian Kilo-class submarines, imported in the early 2000s. The remaining 4 are older Ming-class submarines, which are being phased out.

The PLAN's latest conventional submarines are similar in noise level to their Russian equivalents, and, by extension, close to their Western counterparts.[380] However, diesel-electric submarines are typically smaller

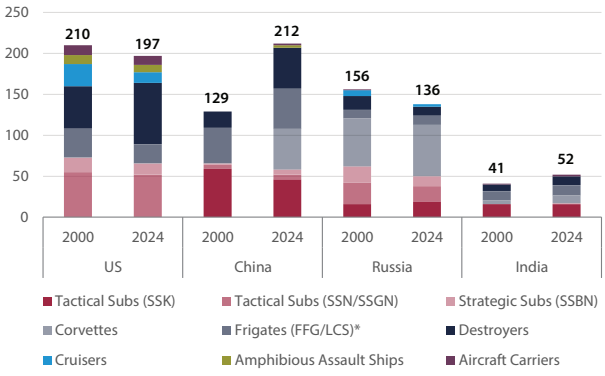


Figure 5.8 Comparison of Navy Surface Combatants and Submarines Quantities

Source: IISS

376 US Department of Defence. *Military and Security Developments* (2024), p. 56.

377 Maya Carlin. China's Type 094 Jin-Class Missile Submarines Can 'Hit' America with Nukes. *National Interest* (8 September 2024). *https://nationalinterest.org/blog/buzz/chinas-type-094-jin-class-missile-submarines-can-hit-america-nukes-208821* (Accessed 2024–11–13).

378 Office of Naval Intelligence. *A Modern Navy with Chinese Characteristics* (July 2009), p. 22.

379 Robert Plummer & Thomas Spencer. China nuclear sub sank in its dock, US officials say, *BBC News* (27 September 2024). *https://www.bbc.com/news/articles/cqjrq0ewj77o*. Accessed 2025–06–12.

380 Ibid., p. 22.

and have limited range compared to nuclear submarines. This limits the number of weapons and types of other equipment that can be carried on the submarine, as well as its underwater endurance.

PLAN Comparison with Other Major Powers

The modernisation and build-up of the PLAN has been prioritised by China since the late 1990s. In 2024, the PLAN is the world's numerically largest navy in terms of surface combatants and submarines; see Figure 5.8.

In terms of tonnage, however, the US Navy is still three times as large as the PLAN. On the other hand, the PLAN has tripled its tonnage since 2000, surpassing the Russian Navy. Meanwhile, the US Navy's tonnage has been stagnant; see Figure 5.9.

The performance of the PLAN's surface ships and conventional submarines, at least on paper, is beginning to approach and, in some rare cases, such as the Type 055 destroyer, even surpass certain capabilities of US, UK, and French destroyers. However, the PLAN still lags behind the US Navy in several key capability areas, most critically in terms of carrier operations, naval aviation, and nuclear-submarine capabilities.

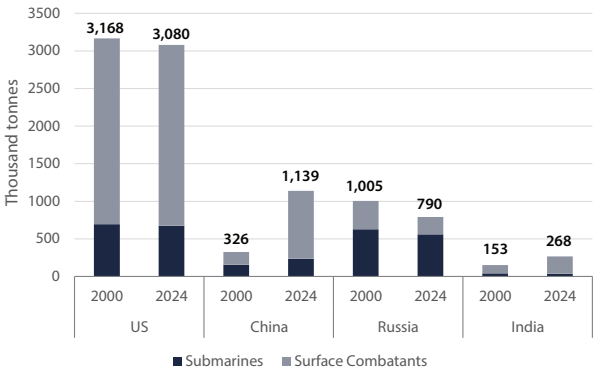


Figure 5.9 Comparison of Navy Tonnage
Source: IISS

5.3 The People's Liberation Army Air Force

Similarly to the army and navy, the People's Liberation Army Air Force (PLAAF) has undergone a drastic transformation in recent decades. As the other branches have done, it has also gradually transitioned from imported Soviet and Russian equipment to a greater emphasis on domestic designs: first, domestic copies of imported aircraft; later, modified versions; and, currently, domestic designs with heavy foreign influence and technology. This technology has been obtained through a combination of legal, unauthorised, and illegal means. In 2024, the PLAAF had more combat aircraft and personnel than the US. However, once the US Navy Aviation and Marine Aviation are included, the US has significantly more aerial assets compared to China.[381]

PLAAF and PLANAF Manpower and Equipment

In 2024, the PLAAF had 403,000 active personnel, all of whom were contracted.[382] In 2024, the PLAAF and PLANAF together had over 2100 combat aircraft, close to 200 bombers, nearly 100 ISR and AEW&C aircraft, over 1000 trainers, and 144 tankers and transport aircraft, as well as 55 helicopters; see Figure 5.10.[383]

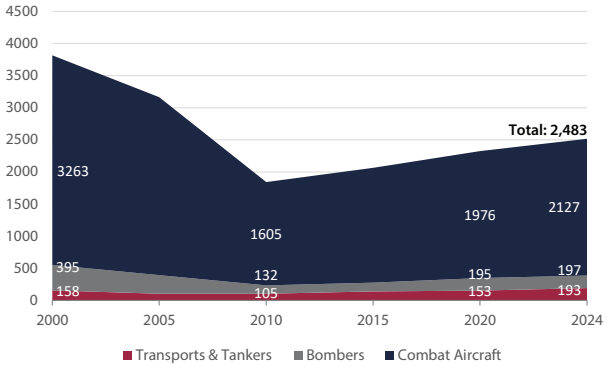


Figure 5.10 Trends in PLAAF and PLANAF Aircraft
Source: IISS

Combat aircraft, over 2100 airframes as of 2024

Combat aircraft constitute the main fighting element of an air force. They include fighters and ground-attack aircraft. These range from obsolete second-generation to modern fourth-generation and advanced fifth-generation aircraft; see Figure 5.11.[384]

The Chengdu J-20 Mighty Dragon is China's first fifth-generation fighter, introduced on 9 March 2017.[385] Fifth-generation fighters typically combine advanced

381 IISS. *The Military Balance 2024*, pp. 259–260.
382 Ibid., p. 259.
383 Ibid., pp. 259–261.
384 It is worth noting that China's classification system for fighter aircraft counts one generation less than Western standards; aircraft like the J-20 are therefore classified as fourth-generation aircraft, while the J-10 is considered third generation.
385 State Council of Information Office of the People's Republic of China. China's first stealth fighter J-20 enters service with Air Force (People's Republic of China, 13 March 2017) *https://web.archive.org/web/20180414012303/http://www.scio.gov.cn/32618/Document/1544722/1544722.htm* (Accessed 2024–09–30).

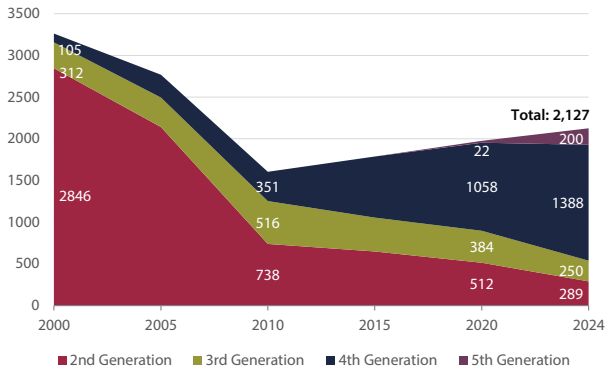


Figure 5.11 Modernity of PLAAF Combat Aircraft by Generation
Source: IISS

radar and infrared sensors with powerful engines and low-observability (LO) design to avoid detection from enemy radar and sensors. China is the second country in the world, after the US, to field such an aircraft in any numbers. At the beginning of 2024, the PLAAF was estimated to have fielded about 200 J-20s.

The stealth, or low observability, performance of the J-20 is a contested topic among military analysts. It features the angular design of other fifth generation fighters as well as radar absorbent composite materials. However, actual performance is unknown. There are openly available computer simulations of the J-20 radar cross-section. One of these indicates that the J-20 has good frontal radar cross-section performance, while overall stealth characteristics are inferior to the US F-22 and F-35, but superior to the Russian Su-57.[386]

Propulsion has been a problem for the J-20. It was initially planned to be powered by the domestic WS-15 turbofan engine. However, following delays in that propulsion system, a Russian AL-31FM2 engine was used in the early versions of the J-20, with the domestic Shenyang WS-10C becoming an intermediate solution.[387] By June 2023, online photos of the J-20 seemed to confirm test flights with the WS-15, which is cited to have performance characteristics that would narrow the gap to US engines in terms of thrust.[388] However, actual performance is difficult to discern. Overall, the J-20 is unlikely to be an outright peer of the American F-35 or F-22 fighters. However, it does provide the PLAAF with fifth generation capabilities.[389]

The PLAAF's fourth-generation fighters are a mix of derivatives from the Russian twin-engine Su-27 and domestically developed single-engine J-10s. In the 2000s, China began reverse engineering the Su-27 into the J-11 as well as the Su-33 into the carrier based J-15.[390] The J-11 has since undergone a range of upgrades, including the much-improved J-11B. The latest iteration, the J-16, likely surpasses its Russian counterparts in several areas, marking a clear milestone in China's combat-aircraft development.[391] The J-16 features composite materials with radar-absorbent properties, advanced radar and infrared sensors, and two domestic WS-10 engines, as well as targeting pods for ground attack. China has also developed an electronic warfare variant, the J-16D.[392]

The J-10 is a light single-engine fighter, a more affordable workhorse compared to twin-engine fighters, but less capable in several areas. This is a high-low mix present in many major-power air forces. Developed in the late 1980s, the J-10 is heavily influenced by the Israeli Lavi. Original production runs were powered by Russian engines, but the latest iteration, the J-10C, is equipped with domestic turbines.[393] The J-10 is the Chinese equivalent to the F-16 and displays similar performance characteristics.

386 It is worth noting that these simulations only account for the radar signature from the aircraft's shape and not for the presence of radar-absorbent materials or for infrared signature; see Aircraft 101 (2022). *J-20 Radar scattering simulation*. *https://basicsaboutaerodynamicsandavionics.wordpress.com/2022/11/27/j-20-radar-scattering-simulation/* (Accessed 2024–09–30); Michael J. Pelosi & Carlo Kopp. A Preliminary Assessment of Specular Radar Cross Section Performance in the Chengdu J-20 Prototype. *Air Power Australia* (2011). *https://ausairpower.net/APA-2011–03.html* (Accessed 2024–09–30).

387 Rick Joe. China's J-20 Gets Another Upgrade. *The Diplomat* (1 August 2023). *https://thediplomat.com/2023/08/chinas-j-20-gets-another-upgrade/* (Accessed 2024–09–30).

388 Christoffer McFadden. Footage surfaces of China testing a J-20 with twin WS-15 engines to rival the US. *Interesting Engineering* (5 July 2023). *https://interestingengineering.com/innovation/j20-with-twin-ws15-engines* (Accessed 2024–09–30).

389 Similar arguments are made by, e.g., Jouppi, Matthew. Face It: China's J-20 Is A Fifth-Generation Fighter. *Aviation Week* (5 April 2021). *https://aviationweek.com/defense/aircraft-propulsion/face-it-chinas-j-20-fifth-generation-fighter* (Accessed 2024–10–02).

390 For example, Cheung Tai-Ming. Innovation in China's Defense Technology Base: Foreign Technology and Military Capabilities. *The Journal of Strategic Studies* Vol. 39, nos. 6–7. (2016): pp. 728–761.

391 Ricardo Meier. How China made the J-16 fighter better than the Su-30. *AirDataNews* (28 March 2021). *https://www.airdatanews.com/how-china-made-the-j-16-fighter-better-than-the-su-30/* (Accessed 2024–11–13).

392 Joseph Trevithick. China's J-16D Electronic Attack Jet Seen Sporting Jamming Pods For The First Time. *The Warzone* (25 September 2021). *https://www.twz.com/42511/chinas-j-16d-electronic-attack-jet-seen-sporting-jamming-pods-for-the-first-time* (Accessed 2024–11–13).

393 Peter Suciu. China's J-10C Fighter Jet Is A Killer In the Sky. *National Interest* (20 August 2024). *https://nationalinterest.org/blog/buzz/chinas-j-10c-fighter-jet-killer-sky-207294* (Accessed 2024–11–13).

The J-35 is China's second fifth-generation combat aircraft. Smaller and lighter than the J-20, it is capable of operating from aircraft carriers to complement the current J-15. In November 2024, the air force version, the J-35A, was revealed to the public. The J-35 has a striking exterior resemblance to the American F-35, although to what degree the aircraft are comparable in performance is still unknown. The F-35 is a networked aircraft with many of its advantages hidden in its software package, features which might be more difficult to mimic or match.[394]

In December 2024, two previously undisclosed Chinese fighter aircraft appeared online. Both were tailless and stealthy designs and quickly dubbed next generation or sixth-generation combat aircraft by observers. While it is still unclear whether these aircraft are prototypes or just technology demonstrators, they do offer some insights into Chinese thinking about future air power. The larger of the two aircraft, called the J-36 in media, is significantly larger than a J-20, has three engines and should have a large internal space for long-range weapons. Even less is known or has so far been discerned about the smaller aircraft. Although it is smaller, it has two engines and would still qualify as a fairly large fighter, if intended as such.[395] While little is known about the two new aircraft, such as how much of a next or sixth generation they actually constitute, they do offer a departure from previous Chinese aircraft projects. In this case, China has very little experience from other nations to build upon, as no one else has yet to field an operational sixth generation aircraft. This is not only a sign of defence industrial maturity, but also adds uncertainty and risk.

Bombers, 197 airframes as of 2024

The PLAAF operates the H-6 bomber. This is an old design based on the Soviet Tu-16, imported in the 1950s. The H-6 has since been updated several times. While the basic design remains old, the same is true of the American B-52 bomber. They function as bomb trucks, able to deliver massive payloads at stand-off range. Some are also nuclear-capable; an example is the H-6N, which can carry air-launched ballistic missiles.[396]

Bombers are typically large and slow, which makes them vulnerable as targets to enemy fighters and air-defence systems. The US operates stealth bombers, such as the B-2, which are designed to avoid detection. There have been rumours for some time that China is developing its own stealth bomber, called the H-20. In late 2024, a first concept was demonstrated, implying that the actual bomber is still likely in the early development phase.[397] The US has an established advantage in terms of stealth bombers. The introduction of the B-21 will cement that lead. However, the addition of a stealth bomber would provide the PLA with a new capability, potentially enabling deeper strikes into enemy territory, regardless of whether the H-20 can measure up to the B-21 or not.

Transports and Tanker Aircraft, 144 airframes as of 2024

The PLAAF and PLANAF transport fleet still relies on its ageing fleet of Soviet medium Antonov and heavy Ilyushin aircraft. Similarly, its tanker fleet consists of 18 IL-78 aircraft and converted H-6 bombers. The domestically developed and produced 50 Y-20 heavy transports and 8 YY-20 tankers offer the PLAAF new capabilities in terms of troop deployment and combat-aircraft range. China's overall transport capacity remains limited, especially compared to the US. However, China does not have the same need for expeditionary capabilities. Regardless, the PLAAF transport and tanker fleet is modernising and expanding.

Electronic Intelligence and Electronic Warfare Aircraft, 69 airframes as of 2024

Electronic intelligence and electronic-warfare aircraft act as force multipliers for an air force. The PLAAF and PLANAF operate a variety of such aircraft, including the KJ-200, but have yet to settle on a standard platform.

The PLAAF has made significant strides to catch up to other major powers during the last two decades. China's combined combat aircraft inventory is twice

394 Thomas Newdick & Tyler Rogoway. China's J-35A Stealth Fighter Officially Breaks Cover. *The Warzone* (5 November 2024). *https://www.twz.com/air/chinas-j-35a-stealth-fighter-officially-breaks-cover* (Accessed 2024–11–26).

395 Tyler Rogoway. What China's Next Generation Stealth Jet Reveal Really Means. *The Warzone* (15 January 2025). *https://www.twz.com/air/what-chinas-next-generation-stealth-jet-reveal-really-means* (Accessed 2025–01–29).

396 Robert Farley. China's 70-Year Old Xian H-6 Bomber Is Still a Killer. *National Security Journal* (23 September 2024). *https://nationalsecurityjournal.org/chinas-70-year-old-xian-h-6-bomber-is-still-a-killer/* (Accessed 2024–11–13).

397 Army Recognition. Exclusive: China Unveils First Concept of H-20 Stealth Bomber Aiming to Compete with US B-21 Raider. *Army Recognition* (10 November 2024a). *https://armyrecognition.com/news/aerospace-news/2024/exclusive-china-unveils-first-concept-of-h-20-stealth-bomber-aiming-to-compete-with-us-b-21-raider* (Accessed 2024–11–13).

the size of Russia's and three times larger than India's. For instance, the PLAAF is developing new combat methods, operations, and tactics for unmanned aerial vehicles (UAVs). These include remote take-offs and landings at locations far from home airbases and, potentially, manned-unmanned teaming (MUM-T).[398] Much of the drone technology has been developed for use in a potential battle over Taiwan. However, the PLAAF and PLANAF still have fewer aircraft than the US Air Force, Navy, and Marines. The US also has a significant lead when it comes to fifth-generation aircraft, having introduced these over a decade earlier than China; see Figure 5.12. Overall, individual US combat aircraft are also often deemed to be more advanced and capable compared to their Chinese counterparts.

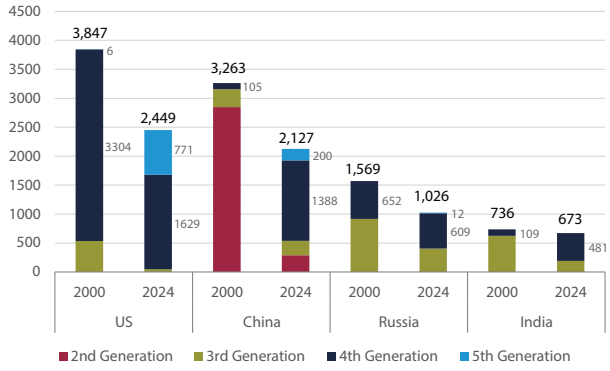


Figure 5.12 Comparison of Combat Aircraft Quantities
Source: IISS

Rapid modernization but still lagging behind the US

The PLAAF has undergone a rapid modernisation process during the past decades. With the introduction of the fifth-generation J-20 and four-point-five-generation J-16 and J-10C, it has narrowed the technological gap with other major powers, surpassing its aircraft provider Russia in several key areas. While China likely lags behind European countries in some respects, it also has technologies that European countries have yet to develop domestically, most notably fifth-generation aircraft.

However, China still has a long way to go to catch up to its main strategic rival, the US, which still maintains a technological edge when it comes to military aircraft and their underlying technologies. In terms of low observability, sensors, and sensor fusion, the US has a well-established lead that it continues to build upon. China's historic problem with high-end combat aircraft engines has been mitigated by new designs such as the WS-15. However, since little is known about the exact capabilities of these new engines, it is far too early to state that the problem has been solved.

5.4 The People's Liberation Army Rocket Force

The PLA Rocket Force (PLARF) is responsible for China's land-based conventional and nuclear missiles. Its conventional arsenal includes several thousand short, medium-, and intermediate-range ballistic missiles, as well as hypersonic glide vehicles, ground-launched cruise missiles, and anti-ship ballistic missiles.[399]

Meanwhile, China's nuclear arsenal has been expanding for some time, from about 200 warheads a decade ago to over 500 in 2023, according to the US Department of Defence.[400] China has a large fleet of missile-carrying vehicles and an increasing number of strategic submarines; in 2021, it was revealed that China had begun building new silo fields capable of storing intercontinental ballistic missiles. Nuclear missiles have also become more advanced and diverse, with a growing share being capable of carrying Multiple Independently Targetable Re-entry Vehicles (MIRV). This includes China's newest intercontinental ballistic missile (ICBM), the DF-41, which has an estimated range of 12,000 kilometres, covering most of the continental USA.[401]

The US DoD reports that China is moving towards an increasingly viable "nuclear triad" of land-, sea-, and air-based systems. An early-warning attack system, which can provide China with an alert notice, potentially

398 Akhil Kadidal. PLAAF developing new combat methods for UAVs. *Janes* (16 August 2023). *https://www.janes.com/osint-insights/defence-news/air/plaaf-developing-new-combat-methods-for-uavs (*Accessed: 2024–04–03).

399 US Department of Defence. *Military and Security Developments* (2024), p. 66.

400 Ibid., p. 111.

401 Hans M. Kristensen, Matt Korda, Eliana Johns & Mackenzie Knight. Chinese nuclear weapons, 2024. *Bulletin of the Atomic Scientists* (2024). *https://thebulletin.org/premium/2024–01/chinese-nuclear-weapons-2024/* (Accessed 2024–11–26).

allowing for launch on warning, is being developed. In 2021, China for the first time successfully placed a hypersonic boost-glide vehicle (HGV) on an intercontinental ballistic missile (ICMB) with a fractional orbital bombardment system (FOBS). This system can be used to evade missile defences. China is also undergoing operational changes that have increased the PLARF's readiness level.[402]

In terms of quantity, China's nuclear arsenal of 500 still lags far behind the over 5200 of the US or nearly 5900 of Russia.[403] The PLA Rocket Force is estimated to continue its nuclear expansion, with the US indicating that China could have up to 1000 nuclear warheads by 2030 and 1500 by 2035 if current production trends remain.[404]

In terms of conventional forces, the PLARF possesses what has been described as the world's largest ground-based missile force, with over 2200 conventionally armed ballistic and cruise missiles. Several of the PLARF's medium- and intermediate-range ballistic missiles, with ranges between approximately 1000 to 5500 kilometres, have conventional variants. The long-range CJ-10 cruise missile is the only cruise missile controlled by the PLARF—others are with the PLAN or PLAAF—which has a range of about 1500 kilometres. The PLARF also has a large number of anti-ship ballistic missiles, such as the DF-21.[405]

5.5 The Four Arms

The former PLA Strategic Support Forces (PLASSF) was responsible for resources meant to improve the PLA's ability to fight informationised conflicts. Several departments within this branch were tasked with responsibilities related to space, information, and cyberspace capabilities. In April 2024, the PLASSF was dissolved and its departments were reorganised into three new arms. Together with the pre-existing Joint Logistics Support Force (JLSF), these now constitute the PLA's four arms that support its four services. The reasons behind this change could include an increased emphasis on the individual components of the former branch. It may also signal a desire on the part of the Central Military Commission (CMC) to gain direct control over these functions, or reflect dissatisfaction with the way the former PLASSF worked.

PLA Aerospace Force

The PLA Aerospace Force (PLAASF) can be seen as analogous to the US Space Force, similarly highlighting the importance of space as a domain. The PLAASF is likely to have inherited the space assets of the former Strategic Support Force, including military satellites, satellite-launch facilities, and astronaut training.[406] The PLAASF operates at least eight bases for satellite launch, tracking, and operations, and is responsible for the PLA's space-based intelligence and its assets, surveillance, and communications.[407]

The PLA Cyberspace Force

The PLA Cyberspace Force (PLACSF) is responsible for cyberspace warfare, information warfare, electronic warfare, and psychological warfare. According to the US DoD's Annual Report to Congress, the PLACSF operates five technical reconnaissance bases, several signals intelligence bureaus and multiple research institutes.[408] Its mission is officially described as defensive, focused on countering cyberspace intrusions, but the force also has the capability to conduct both offensive and defensive cyber operations.[409]

The PLA Information Support Force

The PLAISF likely draws some inspiration from the US Joint All-Domain Command and Control (JADC2) initiative. Its purpose is to establish integrated battlefield

402 Christopher Weidacher Hsiung, *Kinas kärnvapenstrategi och förmågor* [China's nuclear capabilities and strategy. An introduction]. FOI Memo 8422 (Stockholm: Swedish Defense Research Agency, 2024).

403 Arms Control Association. *Nuclear Weapons: Who Has What at a Glance* (July 2024). *https://www.armscontrol.org/factsheets/nuclearweapons-who-has-what-glance* (Accessed 2024–11–26).

404 US Department of Defence. *Military and Security Developments* (2024), p. 111.

405 Christopher J. Mihal. Understanding the People's Liberation Army Rocket Force. *Military Review*. (July-August 2021). *https://www.armyupress.army.mil/Journals/Military-Review/English-Edition-Archives/July-August-2021/Mihal-PLA-Rocket-Force/* (Accessed 2024–11–26).

406 Matt Bruzzese & Peter W. Singer. Farewell to China's Strategic Support Force. Let's meet its replacements. *Defence One* (28 April 2024). *https://www.defenseone.com/ideas/2024/04/farewell-chinas-strategic-support-force-lets-meet-its-replacement/396143/* (Accessed 2024–11–26).

407 US Department of Defence. *Military and Security Development* (2024), p. 69.

408 Ibid.

409 Bruzzese & Singer. Farewell to China's.

awareness and ensure command and control. This development reflects the PLA's ongoing effort to become an "informationised" force. The creation of the PLAISF may also have been informed by the lacklustre early performance of the Russian Armed Forces in its war against Ukraine.[410] According to the US DoD Annual Report to Congress, the role of PLAISF is to coordinate "the development and application of PLA network information systems and provides communications support to the PLA."[411]

The PLA Joint Logistics Support Force

The PLA Joint Logistics Support Force (PLAJLSF) was established in 2016 and was formally recognised as an arm of the PLA in 2024. It consolidates the PLA's joint logistical resources. The PLAJLSF operates five joint logistic support centres (JLSCs), one in each theatre command, to streamline logistics support within the PLA. It provides materiel and joint logistics support brigades, including mobile logistics during combat operations.[412]

5.6 Concluding Remarks

The military modernisation of the PLA during the last two decades has seen it transformed from an outdated and underfunded force, into a modern military with state-of-the-art equipment. However, China's military modernisation is still very much an ongoing process. In terms of military expenditure, China only spent one third as much as the US in 2023. Moreover, in terms of military equipment, the PLA still lags behind the US Armed Forces in several key areas, such as combat aircraft, command and control assets, aircraft carriers, and nuclear submarines. Questions also remain concerning the exact performance of Chinese military equipment, which is largely unknown. In addition, issues that, in our analytical framework, are classified as conditional factors, such as the ability to conduct joint operations, leadership and training practices, issues of corruption, and the level of real combat experience, need to be taken into account.

However, while it is interesting and important to assess China's military equipment in relation to its main geopolitical rival, it is just as important to address the overall trend of China's military modernisation. So far, this has undoubtedly been rapid and comprehensive. The CCP leadership aims to have a world-class military by 2049, and this long-term ambition remains unchanged. While several hurdles remain, and some may become even more daunting, the overall trajectory is upwards.

This chapter offers a broad, but incomplete, description of the resources available to the PLA. The focus has been on the main equipment available to the four services, while the four arms have only been briefly discussed. Future studies could examine these four arms in greater detail. The focus on main equipment within each service has meant that the PLAN Marine Corps and the PLAAF Airborne Corps have not been included in this chapter. Nor has the growing number of unmanned systems been discussed. These resources provide important capabilities to the PLA and should be included in future studies on China's military power.

Future studies could also broaden the methodological scope of outlining PLA resources. Interviews with experts would add in-depth insights into the functioning and strategic thinking of the PLA. Satellite imagery could add to our understanding of resource availability and sophistication of logistics. For instance, mapping the movement of naval and air force vessels over a certain time period could tell us something about the readiness of these branches and the availability of resources over time. The deployment of forces, and their speed and scope, could indicate the PLA's ability to move soldiers and equipment, as well as the distances over which they can be deployed. Such factors offer valuable additional insights when analysing China's military power. ■

410 Annette Lee & James Bellacqua. The Chinese Military's New Information Support Force. *CAN* (2 August 2024). *https://www.cna.org/our-media/indepth/2024/08/chinese-information-support-force* (Accessed 2024–11–26).

411 US Department of Defence. *Military and Security Developments* (2024), p. 68.

412 Ibid., p. 72.

6. China's defence-industrial base

Frida Lampinen

A strong defence industry is vital to the military modernisation process and a key component of the ambitions of any aspiring military great power. In that sense, this chapter relates to our analytical framework, as it deals with the elements of the material resource base (block one) in the study and assessment of military power.

This chapter takes a closer look at the role of the defence industry in building China's military power. *Who* are the main actors within the defence-industrial base and *what kind* of procurement does the leadership prioritise in building the future capabilities of the People's Liberation Army (PLA)? The chapter sets out to answer these questions by means of qualitative literature analysis. It draws upon a wide variety of sources, including both primary and secondary literature, such as English-language reports and articles, Chinese-language media and academic texts, Chinese government websites, and arms expenditure data from international institutes. Chinese material was collected by conducting searches in the scholarly database China National Knowledge Infrastructure (CNKI) database and various internet search engines, from newsletters, and by simply browsing websites such as Chinese open-source encyclopaedias and discussion forums to get a sense of industry trends. Although the Chinese web appears to be under stricter censorship than before (certain key policy documents mentioned in secondary sources can no longer be accessed online), interesting bits of information on defence industrial affairs can still be found.[413] A particularly useful source is financial analyses produced by Chinese investment companies. Using the answers to these questions as an analytical baseline, the chapter suggests three central parameters: strategic guidance and political leadership, financial support, and defence market incentive structures, that future studies could examine in greater depth.

6.1 Organisational composition and key actors

The People's Republic of China (PRC)'s defence-industrial base (DIB) consists of a large web of actors engaged in the development and production of a wide range of conventional and strategic arms across six industrial sectors: aerospace, aviation, electronics, nuclear, ordnance, and shipbuilding.[414] This broad scope of the defence sector stems from the concept of self-reliance, which the Chinese Communist Party (CCP) under Mao Zedong in the 1950s designated as the guiding principle of China's industrialisation, intended to ensure that the responsibility for China's rise to power and prosperity would rest in the hands of the regime rather than in those of external forces.[415] However, it would take exceptional national economic growth, increasing external security pressures, and several decades of intensive technological learning before China could afford the political prioritisation, financial resources, and expertise necessary to comprehensively and significantly begin to strengthen its DIB from the mid-2000s onwards. Despite its struggle to overcome structural limitations owing to its centrally planned Soviet-style organisation, a series of market-oriented reforms have enabled the industrial base to make substantial progress in its technological, economic, and industrial performance.[416]

The DIB's modernisation journey has been thoroughly studied and the consensus is that its manufacturing has improved greatly in terms of both quality and technological maturity (see Chapter 3 of this report for a literature review). While the Chinese DIB's production capacity is a key factor in its utility as a military resource, this chapter does not focus on the DIB's output. The secretive nature of defence procurement, combined with the sheer size and complexity of

413 The author did, however, experience difficulties accessing many websites, as they require users to register an account and verify it with a PRC phone number or WeChat profile—making these sources less accessible to international observers.

414 Bitzinger. Reforming China's Defense Industry, pp. 99–118.

415 Kenneth Lieberthal. *Governing China: From Revolution through Reform*. 2nd ed. (New York: W.W. Norton and Co., 2004).

416 Lieberthal. *Governing China,* pp. 85–89; Tai Ming Cheung, Thomas Mahnken, Deborah Seligsohn, Kevin Pollpeter, Eric Anderson & Fan Yang. *Planning for Innovation: Understanding China's Plans for Technological, Energy, Industrial, and Defense Development* (Institute on Global Conflict and Cooperation, University of California, 2016), pp. 130–136.

the DIB, makes it difficult to evaluate its capabilities and the performance of its arms producers.[417] Instead, this chapter focuses on the DIB's organisation, a central element in providing an overview that may serve as a springboard for future analyses.

The first step in such an overview is to understand who the major actors are. This chapter understands the PRC's DIB as comprising three categories of actors: production enterprises, government acquisition organisations, and research organisations.[418] This section reviews the characteristics of each actor category in turn. Besides these three categories, the CCP and various organs of the State Council exert an overarching influence on the management, funding, and leadership of the defence sector. Particularly influential is the State Administration of Science, Technology, and Industry for National Defence (SASTIND), which falls under the Ministry for Industry and Information Technology (MIIT). SASTIND oversees administrative affairs related to the defence conglomerates and coordinates dual-use and defence technology research and/or transfers among civilian and military actors. As part of this mission, it manages several national platforms for defence acquisition and research.[419] Similarly, the Science and Technology Commission of the Central Military Commission (CMC) is responsible for strengthening the strategic management of defence science and technology.[420] As one of the PRC's seven strategic industries, the defence industry (alongside aviation, coal, electricity, petroleum, shipping, and telecommunications) is subject to higher levels of direct Party-state control.[421]

Production enterprises

The core function of the defence industry is to develop and produce arms and military equipment for the PLA. The Chinese defence economy involves two types of arms producers: state-owned and private enterprises. The state-owned enterprises (SOEs) are the defence economy's primary producers. The owner of these enterprises is the State-owned Assets and Administration Commission (SASAC), an entity that performs the corporate ownership function of the State Council, indicative of a high degree of top-down state control.[422] While the enterprises are accountable to SASAC for their financial performance, SASTIND is responsible for supervising their everyday operations.[423]

Before introducing the relevant enterprises, some historical context for Chinese weapons production is necessary. Originally, arms production was carried out by five government ministries (responsible for aerospace, aviation, nuclear, ordnance, and shipbuilding).[424] However, due to issues inherent in their planned-economy setup, the ministries struggled with inefficiency, overcapacity, bureaucratic fragmentation, and unprofitability. This translated into a poor capacity to produce weapons that met the PLA's requirements; even though China was a net arms exporter throughout the 1960s to early 1990s, the PLA sourced the majority of its armaments from abroad well into the mid-2000s.[425] In the cases where these entities produced advanced systems, the projects were both delayed and significantly over budget.[426] To remedy these issues, the government initiated

417 Cortney Weinbaum, Caolionn O'Connell, Steven W. Popper, M. Scott Bond, Hannah Jane Byrne, Christian Curriden, Gregory Weider Fauerbach, Sale Lilly, Jared Mondschein & Jon Schmid. *Assessing Systemic Strengths and Vulnerabilities of China's Defense Industrial Base. With a Repeatable Methodology for Other Countries* (Santa Monica: RAND Corporation, 2022).

418 This analytical framework is presented in Sarah Harting, Daniel Gonzales, Michael J. Mazarr & Jon Schmid. *Comparative Analysis of U.S. and PRC Efforts to Advance Critical Military Technology* (Santa Monica: RAND Corporation, 2024).

419 Tobias Junerfält. *China's Technology Transfer Ecosystem. Key Actors and the Case of China Electronics Technology Group* Corporation FOI-R--5641--SE (Stockholm: Swedish Defense Research Agency, 2024); Marcel Angliviel de la Beumella, Ben Spevack & Devin Throne. *Open arms: Evaluating global exposure to China's defense-industrial base* (C4ADS, 2019).

420 Tai Ming Cheung. *Innovate to Dominate: the Rise of the Chinese Techno-Security State* (Cornell University Press, 2022), p. 165.

421 Lucie Béraud-Sudreau & Meia Nouwens. Weighing Giants: Taking Stock of the Expansion of China's Defence Industry. *Defence and Peace Economics* 32:2 (2021): pp. 151–177.

422 State-owned Assets Supervision and Administration Commission of the State Council. *Interim Regulations on Supervision and Management*. Decree of the State Council of the People's Republic of China No. 378 (2003); Sarah Kirchberger & Johannes Mohr. China's defence industry. In Keith Hartley & Jean Belin (eds.). *The Economics of the Global Defence Industry* (New York: Routledge, 2019), p. 45.

423 Peter Wood & Alex Stone. *China's Ballistic Missile Industry* (China Aerospace Studies Institute, 2021), p. 5; Marcel Angliviel de la Beumelle, Ben Spevack & Devin Throne. *Open Arms: Evaluating global exposure to China's defense-industrial base* (C4ADS, 2019).

424 Bitzinger. Reforming China's defense industry: pp. 762–789.

425 Michael S. Chase, et al. *China's Incomplete Military Transformation: Assessing the Weaknesses of the People's Liberation Army (PLA)* (Santa Monica: RAND Corporation, 2015), pp. 125–134.

426 Bitzinger. Reforming China's Defense Industry.

a series of restructuring reforms in the late 1980s to incentivise technology innovation and improve performance.[427] During the 90s, the ministries were restructured into state-owned corporate enterprises. A few years later, in 1999, the State Council ordered each of the five SOEs to split into two, hoping that the presence of two producers in each industrial sector would encourage them to compete with each other in a business-like fashion.[428] A defence-electronics enterprise, the CETC, was established in 2002 to meet the PLA's rising demand for information and communications technology equipment.[429] After the restructuring, there have since been three cases of re-mergers.

Consequently, the Chinese defence economy presently features eight major defence SOEs: China Aviation Industry Corporation (AVIC), China Aerospace Science & Technology Corporation (CASC), China Aerospace Science & Industry Corporation (CASIC), China Electronics Technology Group Corporation (CETC), China National Nuclear Corporation (CNNC), China South Industries Group Corporation (CSGC), China State Shipbuilding Corporation (CSSC), and China North Industries Group Corporation (NORINCO, or CNGC); see Figure 1 below.[430] These eight enterprises are massive conglomerates that hold a monopoly position in their respective sector or segment (with little to no overlap in product portfolios), and together they supply the majority of the equipment purchased by the PLA. Each conglomerate controls hundreds of subsidiaries including factories, sub-contractors, and R&D units distributed all across China, in total employing about 2 million staff.[431] Besides these eight, additional SOEs take part in the defence economy on a lesser but still significant scale, producing components rather than assembling complete weapons systems. These include Aero Engine Corporation of China (AECC), the country's top producer of military-aircraft engines; China Electronics Corporation (CEC), a producer of dual-use electronics, semiconductors, and telecommunications components; and China Academy of Engineering

Table 6.1 The Chinese defence economy's "big eight."

Sector	Enterprise	Major defence products	Arms revenue in USD million in 2023 (share of total revenue)
Aerospace	China Aerospace Science & Industry Corporation (CASIC)	Tactical missile systems incl. cruise missiles; air-defence systems; hypersonic missiles	8850 (32%)
Aerospace	China Aerospace Science & Technology Corporation (CASC)	Ballistic missiles, rocket engines and space launch vehicles (Long March series); satellites; Tiangong space station; spacecraft; lunar rovers	12,350 (30%)
Aviation	China Aviation Industry Corporation (AVIC)	Aviation weapons and equipment, military aircraft; helicopters; UAVs; flight-control technologies	20,850 (25%)
Electronics	China Electronics Technology Group Corporation (CETC)	Early-warning systems; integrated information systems; radar; communication and navigation; electronic warfare; UAVs	16,050 (28.7%)
Nuclear	China National Nuclear Corporation (CNNC)	Nuclear power (commercial and naval); fuel assembly and enrichment; power-plant construction; related equipment	1840 (4.6%)
Ordnance	China North Industries Group Corporation (NORINCO or CNGC)	Land systems; armoured vehicles; artillery; chemical engineering; air defence and anti-missile systems	20,560 (26.8%)
Ordnance	China South Industries Group Corporation (CSGC)	Armaments; advanced munitions; assault weapons	5130 (11.7%)
Shipbuilding	China State Shipbuilding Corporation (CSSC)	Naval weapons systems; submarines, warships, torpedoes and support vessels; aircraft carriers; UUVs	11,480 (23.5%)

Source: Joske. The China Defence Universities Tracker; Béraud-Sudreau & Nouwens. Weighing Giants, pp. 166-168; SIPRI. The SIPRI Top 100 arms-producing and military services companies in the world, 2023 (2024).

427 Additionally, these reforms occurred during a period when the defence sector received less funding. See Yoram Evron. *China's Military Procurement in the Reform Era: The Setting of New Directions* (New York: Routledge, 2015).

428 Bitzinger. Reforming China's Defense Industry.

429 Matthew Luce. A Model Company: CETC Celebrates 10 Years of Civil–Military Integration. *China Brief* 12:4 (2012).

430 There is no prevailing consensus in the literature on the number of defence SOEs in China. This study draws the line for "major" SOEs based on the scope of the corporations' product catalogues (i.e., systems or components) and their inclusion in SIPRI's Arms Industry Database.

431 Kirchberger & Mohr. China's defence industry: p. 44–48; See Junerfält, *China's Technology Transfer Ecosystem*, for an excellent case study on CETC that shows in detail the complexity of these conglomerates.

Physics (CAEP), formally a research institute but nonetheless the nation's central nuclear-warhead producer.[432] Another central SOE sometimes referred to as a defence conglomerate is Commercial Aircraft Corporation of China (COMAC), which supports the defence aviation sector with dual-use flight technologies.[433]

The consistent commitment to restructuring and modernising the DIB over the past 25 years has positively affected the corporations' profitability as well as the quality of their output. During the period 2004–2015, the accumulated profits of the defence SOEs increased by 800 percent.[434] Their large arms sales revenues earn each of the eight corporations a spot on SIPRI's list of the top 100 arms companies in the world.[435] However, remarkably and in a way that is distinctively different from the Russian system (which otherwise shares many similarities), most of the Chinese SOEs' profits come from civilian product sales—despite the rising demand for defence procurement over the past 30 years. This is a result of the commercialisation of the defence industry in the 1980s, when the government repurposed military resources for civilian production to boost development and national economic growth.[436] Accordingly, even though the SOEs' competition with other companies on the civilian market has incentivised innovation in non-defence business operations, their dominance in the defence sector means that their military manufacturing still struggles with a lack of innovation and productivity.[437] Old hierarchies and structural divisions have also been a breeding ground for conflicts of interest and corruption in corporate leadership. Following an anti-corruption purge initiated in 2013, at least 15 high-ranking defence industry officials have been investigated.[438]

The second type of arms producer, private enterprises, has gained improved access to the defence economy in the past decade but still holds a minimal market share compared to the SOEs. As part of the efforts in military-civil integration—upgraded to national strategy in 2015—SASTIND has created mechanisms for non-traditional contractors to enter the defence research, development, and acquisition system. One such mechanism is the military industry permit system, through which civilian contractors can apply for defence production licences in order to manufacture products for the PLA and/or serve as subcontractors to the defence SOEs.[439] There are four kinds of permits depending on the type of production, though common to all four is a very thorough screening process that requires PRC ownership of the applicant company. Other mechanisms include online procurement platforms that seek to connect civilian supply with military demand on both national and local levels.[440] Defence trade shows serve a similar purpose. The CMC has also published thousands of national defence patents online to make military technology available to private manufacturers in order to encourage their participation in the defence economy.[441]

However, it appears that private contractors do not engage in defence production as much as is institutionally possible, for various reasons. The extent to which private corporations take part in defence procurement processes is difficult to determine, but the entry barriers to the domestic defence market are high.[442] Obtaining a military production license is a time- and resource-consuming process that requires substantial up-front investments before sales can begin. Even once inside the market, private firms are reportedly excluded from the majority of procurement projects due to a perceived lack of trust, skill or capacity to fulfil complex orders—contrary to the Party-state's ambitions for military-civilian fusion.[443] One study found that more than 70 percent of acquisition tenders advertised on a national-level online procurement platform in 2018-2019 went unfulfilled or were fulfilled through

432 SASTIND. Defence Industrial Group Corporations [军工集团公司]; supplementary information from Alex Joske. *The China Defence Universities Tracker* (ASPI, 2019).

433 Joske. *The China Defence Universities Tracker*; Yoram Evron & Richard A. Bitzinger. *The Fourth Industrial Revolution and Military-Civil Fusion* (Cambridge: Cambridge University Press, 2023), p. 108.

434 Tai Ming Cheung. Keeping Up with the Jundui: Reforming the Chinese Defense Acquisition, Technology, and Industrial System. In Saunders, et al. *Chairman Xi Remakes the PLA*, p. 587.

435 SIPRI. *The SIPRI Top 100 arms-producing and military services companies in the world*, *2023* (2024). AECC, too, features on this list.

436 Dong-min Lee. Swords to Ploughshares: China's Defence Conversion Policy. *Defence Studies* 11:1 (2011).

437 Weinbaum et al. *Assessing Systemic Strengths and Vulnerabilities,* p. 70.

438 K.T. Tang. The Logic of China's Careful Defense Industry Purge. *The Diplomat* (12/9 2024).

439 de la Beumelle, Spevack & Throne. *Open arms*.

440 Ibid.

441 Wang Qiang & Zou Weirong. Chinese military declassifies 4,038 national defense patents. *China Military Online* (2/5 2018).

442 Various estimates of the share of civilian enterprises that participate in defence-related activities appear across the literature, but these are difficult to verify or cover only a limited subset of companies.

443 Cheung. Keeping Up with the Jundui: p. 612; Béraud-Sudreau & Nouwens. Weighing Giants; Chase, et al. *China's Incomplete Military Transformation*.

external channels, i.e., directly assigned to a producer (most likely an SOE) without competitive bidding.[444] In addition, contracts typically offer low profit margins, making small-scale orders barely profitable.[445] For such reasons, private firms' involvement in defence tends to remain limited to the production of subcomponents. There is little available information on the exact nature of their business with the PLA, particularly for software and services.[446] Some firms that work closely with the defence sector include Huawei (telecommunications), SZ DJI Technology Co Ltd (DJI, drones), CloudWalk (facial recognition), and Inspur (Big Data).[447]

Government acquisition organisations

The second major actor category of the defence-industrial base is the government acquisition organisations, which set demand and perform defence-related procurement. This category features two central actor types: the Central Military Commission (CMC) and the PLA armed services.[448] The CMC, under the direct leadership of Xi Jinping, is in charge of formulating the Military Strategic Guideline, a central strategic document that guides the direction of the PLA's modernisation. The guideline was first formulated during the Mao era and is updated regularly. Geostrategic assessments and perceptions of the PRC's security environment form the basis of the guideline, from which follows the identification of key strategic opponents, likely contingencies, and the nature of warfare that the armed forces must strive to master. The CMC also evaluates what military capabilities will be required to meet the objectives.[449] The responsibility for overseeing the development, acquisition, and maintenance of weapons that match these needs befalls the CMC Equipment Development Department (EDD). The EDD replaced the General Armaments Department (GAD) as the manager of the armament acquisition system amid structural reforms of the PLA in 2015–2016.[450] Based on the Military Strategic Guideline, the EDD develops a national Weapons Equipment Development Strategy to define the PLA's armament needs. Although the document is classified, it reportedly runs on a twenty-year cycle and is revised whenever the Military Strategic Guideline is updated (most recently in 2019).[451] The EDD is also responsible for quality-testing procured armaments.

Based on the EDD's national strategy, the PLA's four armed service branches formulate and implement their own operational service-level plans. These plans are also classified but available evidence suggests they detail the specific equipment requirements of each individual branch (PLAGF, PLAN, PLAAF, and PLARF) on a one-year, five-year, and ten-year basis.[452] These plans form the basis for each branch's yearly budget request, which informs how much funding is available for acquisition processes.

Available sources on China's budgeting process suggest that the national defence budget, in principle, corresponds to the combined budget requests of the PLA (adjusted in line with national growth forecasts).[453] The EDD is reportedly more responsive to the needs of the Navy, Air Force, and Rocket Forces than its predecessor GAD was, meaning the modernisation needs of these branches likely receive greater budget attention than previously.[454] The national defence budget, proposed by the CMC and approved by the State Council, differentiates between three expenditure categories: personnel, training, and equipment costs. The equipment costs category covers military R&D, procurement contracts, and post-sales maintenance, but the distribution of funds across these sub-categories, or across PLA

444 de la Beumelle, Spevack & Throne. *Open Arms*, p. 35. The dataset does not detail what type of products the tenders called for, so it cannot be confirmed whether a given product is produced by multiple production enterprise in the first place, , i.e. a tender viable for competitive bidding.

445 Xu Jianzhong & Zhang Song. An Evaluation Study of the Capabilities of Civilian Manufacturing Enterprises Entering the Military Products Market under the Background of China's Civil–Military Integration. *Sustainability* 12:6 (2020).

446 Weinbaum et al. *Assessing Systemic Strengths and Vulnerabilities,* p. viii.

447 U.S. Department of Defense. *Entities Identified as Chinese Military Companies Operating in the United States in accordance with Section 1260H of the William M. ("Mac") Thornberry National Defense Authorization Act for Fiscal Year 2021* (Public Law 116-283) (31/1 2024).

448 The analytical framework presented by Harting, et al. also includes a third actor, the theatre commands. Their role is limited to setting demand, which is not a unique contribution, since the CMC and the PLA branches do this as well. Theatre commands are therefore excluded in this chapter.

449 Cheung. *Innovate to Dominate,* pp. 146–150; Harting, et al. *Comparative Analysis of U.S. and PRC efforts*.

450 Cheung. Keeping Up with the Jundui: pp. 591–592.

451 Cheung. *Innovate to Dominate*, pp. 152–159.

452 Ibid.

453 William Greenwalt & Dan Patt. *Competing in Time: Ensuring Capability Advantage and Mission Success through Adaptable Resource Allocation* (Washington, DC: Hudson Institute, 2021), pp. 38-39.

454 Weinbaum et al. *Assessing Systemic Strengths and Vulnerabilities*, p. 25.

units, is not known.[455] Although equipment costs have accounted for a relatively static share of the defence budget (around 30–40 percent) for the past 15 years, China's defence expenditure has increased by at least 600 percent (accounting for inflation) since 1997 in tandem with the state's GDP growth.[456] The growing budget allowed equipment expenditure to double from RMB 206 billion in 2011 to 403 billion in 2016; see Figure 2 below. Yet, the PRC is notorious for spending more money on defence than is accounted for by the official budget. Some research institutes, most notably SIPRI and IISS, make independent estimates of the PRC's military expenditure.[457]

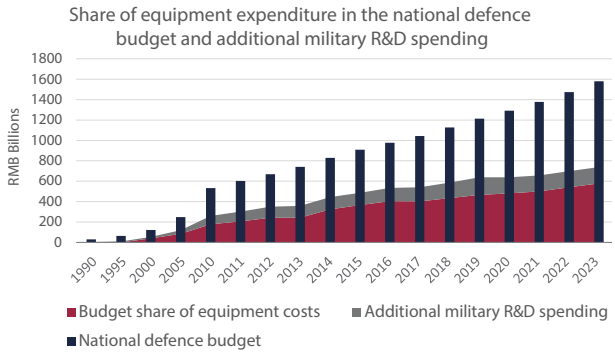


Figure 6.1 China's national defence budget displayed with the share of equipment expenditure and estimated additional military R&D spending.

Source: Tian & Su. A New Estimate of China's Military Expenditure; SIPRI Military Expenditure Database. Data on equipment spending is missing for the years 1990–1995, 2018–2019 and 2023, as official sources do not disclose the budget breakdown for these years. For purposes of graphic presentation, the share of equipment expenditure for these years is assumed to be unchanged from the previous year.

Although China's GDP growth is expected to level out in the next few decades, the US Department of Defense assesses that the PRC can continue to grow its total defence spending for at least the next five to ten years without burdening the national economy.[458] If current budget growth rates are maintained and the share of equipment costs remains stable, annual equipment spending will likely surpass RMB 600 billion within the next few years. These large sums allow for the procurement of very costly weapons systems, potentially including advanced platforms that are financially out of reach for smaller competitors.[459]

After the PLA service branches' budget requests have been approved, incorporated into the national budget, and allocated back to the units, PLA weapons acquisition occurs in five steps: feasibility studies, project design, engineering and development, experiments and design finalisation, and, finally, batch production and delivery.[460] The service branches place their own orders at each of these five acquisition steps and advertise their own procurement tenders, giving them appreciable influence over the technical details (i.e. exactly what kinds of armaments are required and in what volumes).[461] If no domestically produced arms or components fulfil the PLA's standards, the EDD can turn to foreign producers. The section on priorities below discusses the strategic direction of China's future procurement in more detail to provide an idea of the kinds of capabilities the PLA is likely working to acquire.

Research Organisations

The final actor category in the defence-industrial base is research organisations, of which there are three basic types: government research organisations, defence laboratories, and universities. These perform basic and applied R&D to futureproof the defence industry's ability to supply the military technologies that meet the PLA's medium- to long-term demands in line with the Weapons Equipment Development Strategy. Although research units have played a central role in the defence-industrial base since the 1950s, military R&D suffered from a chronic lack of resources and expertise throughout the 20th century. As a result, the defence sector lagged far behind the global frontier, except in a few top-prioritised areas that received concentrated support, creating so-called "pockets of excellence" (e.g. the nuclear weapons programme) within an otherwise aging military force.[462] However, since the late 1990s, the government has made great efforts to push ahead in

455 UN Office for Disarmament Affairs. *UN Military Expenditures (MilEx) Database*, *China.*

456 Bitzinger. Reforming China's defense industry, p. 783.

457 See chapter 3 on methods and sources.

458 U.S. Department of Defense. *Military and Security Developments* (2023), p. 165.

459 Kirchberger & Mohr. China's defence industry, p. 39.

460 Mark Ashby, Caolionn O'Connell, Edward Geist, Jair Aguirre, Christian Curriden & Jonathan Fujiwara. *Defense Acquisition in Russia and China* (Santa Monica: RAND Corporation, 2021), pp. 17–19.

461 Evron & Bitzinger. *The Fourth Industrial Revolution*, pp. 94–95.

462 Bitzinger. Reforming China's Defense Industry.

military R&D by allocating considerably more funding, guidance, and overall attention to the task.

Today, the defence research ecosystem comprises many diverse entities. Combined with complex ownership structures and confusing nomenclature, the secretive nature of their work translates into a lack of transparency concerning the exact function of each actor type. The description below introduces each type of research organisation, along with respective subtypes, to provide a comprehensive base for future studies.

Table 6.2 A summary of research organisation types and subtypes in the defence research ecosystem

Research organisation type	Examples of actor sub-types
Government research organisations	• Chinese Academy of Sciences • Defence S&T Institutes (SOE-affiliated)
Defence laboratories	• Defence S&T Key Laboratories • Defence S&T industrial-technology innovation centres
Universities	• Military universities • Civilian defence universities

Government research organisations

The first type of research organisation is the government research organisation, i.e. research institutes that fall under the PRC government. This includes the Chinese Academy of Sciences and approximately 3700 other research institutes and innovation centres.[463] Although these generally do not focus on military research, they likely do some work related to national defence, given the sector's high relevance to government interests. A distinctively defence-oriented subtype of government research organisation of particular interest, however, is the institutes affiliated with the state-owned defence enterprises. This group, sometimes referred to as defence science and technology (S&T) institutes (军工科院所), includes approximately 260–270 units responsible for researching, designing, and developing new armaments for the defence SOEs.[464] It is not clear whether their work is primarily demand-driven, i.e. commissioned directly by the PLA, or market-driven, i.e. incentivised by profits arising from filling gaps in the market.

Administratively, the institutes are embedded within the SOE corporate structures, but their "parent" SOE does not own them. Rather, they are public institutes whose personnel, equipment, facilities, and research are owned by SASAC. As such, the institutes do not generate revenue or pay any bills. This administrative arrangement originates from the restructuring of the manufacturing ministries in the 1990s, when the research units were designated to remain within the public management structure as non-commercial entities due to the poor economic profitability but high national security relevance of their research.[465] Today, the institutes vary considerably in size, employing anywhere from a few hundred to more than 30,000 researchers, although institutes with more than 5000 staff appear to be relatively uncommon.[466] Many of the larger institutes oversee subsidiary institutes and/or host other types of research organisations, such as laboratories.

Table 6.3 The number of S&T institutes immediately subordinate (i.e., second-tier) to the major eight defence SOEs (2020 estimate)

SOE	Number of S&T institutes
AVIC	39
CASC	70
CASIC	33
CETC	47
CNNC	15
CSGC	6
CSSC	27
NORINCO	24

Source: Shangye Xinzhi. "China's 10 largest defence SOEs."

Some SOEs are more research-heavy than others. This is indicated not only by the number or size of their institutes, which again varies considerably, but also by their position in the corporations' structure: at CASC, CASIC, and CETC, research institutes are

463 Harting et al. *Comparative Analysis of U.S. and PRC efforts*, p. 41; Sinolink Securities. *Analysis of the military industrial reform in four dimensions (part 2)—From industry to enterprise: the upcoming reform of military research institutes* [四大维度解析军工改革系列报告之二——从事。 业到企业：军工科研院所改制呼之欲出]. (2017)

464 Shangye Xinzhi. China's 10 largest defence SOEs, 1000+ units! The most complete list ever! [中国10大军工央企，1000+单位！史上最全！]; Sinolink Securities. *Analysis of the military industrial reform*, pp. 8–9. The first of these sources lists 265 institutes; the second lists 268.

465 Wang Jiang. Why is the conversion of defence S&T institutes important? [军工科研院所转制为什么重要？]. *China Economic Weekly* [中国经济周刊]. 22 (2018).

466 These numbers are based on the author's exploratory review of various S&T institutes' pages on Baidu Baike (a PRC equivalent to Wikipedia) and therefore serve only as a rough estimate.

superior to production units.[467] CASC, for example, has been described as "a big institute and a small company" (大研究所小公司), primarily creating value for the defence sector through its military R&D function—even while selling arms worth over USD 12 billion in 2023.[468] On a related note, it is worth pointing out that the S&T institutes are rarely explicitly defined as defence-oriented. This could seek be intended to imply that their research is non-military, in line with the enterprises' primarily civilian revenue. While some institutes may focus on non-defence research, all institutes likely engage in dual-use research, given the corporations' prominent position in the PRC defence ecosystem. Under China's Military-Civil Fusion strategy, civilian and defence research organisations are encouraged to strengthen "two-way opening" and "effective integration," suggesting that SOE research units share expertise, results, and other resources.[469]

The S&T institutes possess excellent technological competence, to the extent that scholars have described them as the main force in China's defence technology development.[470] However, their lack of financial accountability has led to structural problems, including low returns on invested resources and a limited capacity for innovation attuned to the PLA's needs.[471] The large financial risks associated with defence R&D are far from unique to the PRC. Still, the CCP views this issue as a serious concern, and the SOEs' R&D inefficiency is raised repeatedly in Chinese commentaries.[472] To address these issues, the government initiated reforms in 2014 to transfer ownership of the most business-oriented institutes to their parent SOE. To identify the relevant institutes, SASTIND created a three-tier classification system.[473] S&T institutes that engage in non-profit research in the government's interest will remain government-owned class I or class II public institutes, depending on the research's sensitivity. Institutes that engage in for-profit R&D, commercialisation, or component production have been assigned the enterprise class, meaning they must exit the public management system. In 2017, SASTIND announced a list of 41 enterprise-class institutes slated for corporatisation—though only one institute has successfully restructured so far.[474]

Defence laboratories

The second research organisation type is defence laboratories. These are jointly owned and funded by SASTIND and the CMC's Equipment Development Department (EDD). The laboratories do not operate as stand-alone organisations, but are hosted by other DIB actors, primarily defence SOEs and universities. This co-location management approach appears to be primarily practical in nature (e.g. facility, personnel, and knowledge sharing), as evidence suggests the laboratories engage in distinct research tasks. While some labs conduct interdisciplinary research, most principally specialise in individual focus areas within specific domains (e.g. aerospace), equipment types (e.g., aircraft), or technological areas (e.g., electromagnetics).[475] In general, the CMC EDD's laboratory ownership implies that the labs work closely with the acquisition system. They may perform high-risk research at the early stage of technologyical development—that is, projects with less immediate commercial viability—as well as oversee equipment testing at the final stages of development.[476]

There are three sub-types of defence labs mirroring the structure of the civilian national laboratory system: Defence S&T Key Laboratories (DSTKLs; 国防科技重点实验室), Defence Key Discipline Laboratories (

467 Sinolink Securities. *Analysis of the military industrial reform*, p. 7.

468 Li Jin. Conversion of defence S&T institutes is the main focus of SOE reforms in 2018 [军工科研院所转制是2018年国企改革重头戏]. *Sohu.com* (24/4 2018); Arms revenue from SIPRI's Arms Industry Database.

469 Stone & Wood. *China's Military–Civil Fusion Strategy,* p. 81.

470 Arthur S. Ding & K. Tristan Tang. How Far Can China's Defense Technology Reforms Go? *The Diplomat* (12 November 2022).

471 Yan Jianfeng & Tang Bo. Function Orientation and Reform Models of Defense Industry S&R Institutions in China [我国军工科研院所的功能定位及分类改革研究]. *Journal of Northwestern Polytechnical University* 2 (2018).

472 See, for example, Wang. Why is the conversion; Yan & Tang. Function Orientation and Reform Models.

473 Wang. Why is the conversion; Arthur Ding & K. Tristan Tang. At a Dead End? China's Drive to Reform Defense Science and Technology Institutes Stalls. *China Brief* 23:11 (2023); Sinolink Securities. "Analysis of the military industrial reform, p. 22. The author could not find any information on the distribution pattern of institute classes. Ji Lin implies that the majority of the S&T institutes will remain public institutes; see footnote 465; Jin, Conversion of defence S&T institutes.

474 Ding & Tang. At a Dead End?; The original policy document, titled *Implementation Opinions on the Transformation of Defence S&T Institutes into Enterprises* [关于军工科研院所转制为企业的实施意见] is referenced in multiple secondary sources, but appears to have de-publicised and is no longer available online.

475 Alex Stone & Xiu Ma. *The PRC State & Defense Laboratory System: An Overview* (Montgomery: China Aerospace Studies Institute, 2022), pp. 12–13.

476 Yan & Tang. Function Orientation and Reform Models; Ma Xiu. *The PRC State & Defense Laboratory System Part Two: Defense S&T Key Lab Directory* (Montgomery: China Aerospace Studies Institute, 2023).

国防科技重点学科实验室), and Defence S&T National Laboratories (国防科技国家实验室).[477] The labs' similar titles, along with the tendency for English translations to omit the word "defence," creates substantial confusion for external observers. Overall, it remains unclear exactly how many defence laboratories exist, as most are kept out of the public eye. Nevertheless, the literature offers various estimates. The Australian Strategic Policy Institute (ASPI)'s *China Defence Universities Tracker* suggests there may be at least 165 defence labs operating solely at civilian universities.[478] A directory published by the China Aerospace Studies Institute lists 60 DSTKLs.[479] This directory observes that university-run labs tend to be more open about their work than SOE-run labs. Additionally, the defence laboratory system seemingly includes other kinds of research entities, such as the defence S&T industrial technology innovation centres (国防科技工业技术创新中心).[480] The practical difference between the laboratories and innovation centres remains unclear. Finally, within the civilian state system, they may also contribute to defence technology development, even if this is not their main focus.

Universities

The third and final type of research organisation is universities. Universities are mentioned above as hosts for other defence research entities, but what is referred to here is the research that is conducted as part of the universities' regular academic activity. A primary subtype comprises the 43 military universities. Spearheaded by the Academy of Military Science, the National Defence University, and the National University of Defence Technology, the military universities have two principal research tasks. The first one is conducting technical, engineering, and medicinal military research under direct supervision of the CMC. This includes developing very sensitive technologies or technologies without any civilian use, and early-stage prototyping of new weapons and defence concepts.[481] The second task is to integrate military theory with military S&T by contributing technical expertise to the development of PLA doctrine.[482] The military universities participate in drafting national defence S&T R&D policies and provide overall support for PLA decision-making and weapons acquisition.[483] A secondary sub-type consists of the civilian universities, which function as the cornerstone of the Chinese research community. Of specific significance for the defence ecosystem, however, are the civilian defence universities, which are at the forefront of Chinese defence research and military technology patenting. The most prominent of these are the Seven Sons of National Defence, a group of seven universities with deep connections to the military and some of the best funding among all universities in China.[484]

In sum, the defence-industrial base involves a wide array of actors working to upgrade the PLA's capability. RAND assesses the relationships between government acquisition organisations and research organisations to be strong; the same applies to the link between acquisition organisations and state-owned production enterprises. The linkages between research organisations and production enterprises, as well as between private-sector

Table 6.4 A summary of the Chinese DIB's main actor categories with intra-category actor types and subtypes

Actor category	Actor types	Examples of actor subtypes or entities
Production enterprises	State-owned enterprises	AVIC, CASC, CASIC, AECC
	Private enterprises	Huawei, DJI
Government acquisition organisations	The Central Military Commission (CMC)	CMC Equipment Development Department (EDD)
	The PLA armed services	PLAGF, PLAN, PLAF, PLARF
Research organisations	Government research organisations	Defence S&T Institutes
	Defence laboratories	Defence S&T Key Laboratories
	Universities	Military universities, civilian defence universities

477 Stone & Ma. *The PRC State & Defense Laboratory System: An Overview*, pp. 9–11; Joske. *The China Defence Universities Tracker.*

478 Joske. *The China Defence Universities Tracker.*

479 Ma. *The PRC State & Defense Laboratory System Part Two.*

480 On a service platform on SASTIND's website [政务服务平台], the forms for applying to establish an innovation centre and those for defence laboratories are listed under the same reference category and are found on the same page.

481 Yan & Tang. Function Orientation and Reform Models.

482 de la Beumelle, Spevack & Throne. *Open Arms*; Joel Wuthnow. China's "New" Academy of Military Science: A Revolution in Theoretical Affairs? *China Brief* 19:2 (2019).

483 Yan & Tang. Function Orientation and Reform Models.

484 Joske. *The China Defence Universities Tracker.*

production enterprises and acquisition organisations, are, however relatively weak.[485]

Previous research emphasises the importance of national leadership support in making the defence economy more innovative and efficient.[486] Xi Jinping has taken an active interest in defence industrial matters, rolling out reforms to enhance enterprise performance, establishing a military-industrial group within the political leadership, and strengthening CCP influence in the SOEs to better integrate the defence industry with the state's overarching strategic planning.[487] However, the regulatory system remains partial and non-transparent. Corporate executives are typically high-ranking party members, while acquisition contracts with the PLA tend to be vague, with few contractual obligations. This means that such contracts cannot hold producers accountable for delays or poor-quality deliveries, and the courts (which are under CCP control) have limited authority to settle disputes between buyer and seller when both have influential standing in the party.[488] Structural compartmentalisation remains an obstacle that raises the risks of duplicated efforts.[489]

6.2 Prioritised areas for future procurement

The goal of the Chinese regime is to establish a defence-industrial base that is innovative, self-sufficient, and caters to the PLA's requirements for technology-intensive warfare. In 2017, Xi Jinping declared three milestone goals for the PLA's modernisation: by 2020, the PLA was to have "basically achieved" mechanisation; by 2035, it should complete its force modernisation effort; and by mid-century, it should have become a "world-class military" capable of deterring, fighting, and winning "multi-dimensional" information technology-based wars in any theatre of operations.[490] The first goal was declared complete in 2020, and in 2021, a fourth, intermediate goal was added: to achieve army building and professionalisation by 2027.[491] Chinese defence policy further states that the PLA must be capable of safeguarding the CCP's interests and PRC citizens globally.[492]

PLA rhetoric emphasises science and technology as the foundation of military power. Military writings also underscore the need to integrate defence science, technology, and national industry to meet army-building goals on schedule by 2049.[493] These goals are in lockstep with the CCP's vision of the PRC as a science and technology superpower by 2050, dominant not only in military technologies but in all technologies foundational to economic development. This means that the CCP maintains a strong and generalised interest in emerging and disruptive technologies such as artificial intelligence (AI), advanced microelectronics, quantum information, neuroscience, space, and deep-sea technologies, among many others.[494]

While national interests in S&T certainly resonate throughout the defence sector, leadership statements and PLA writings identify defence-specific priority areas. These areas largely overlap with the interests described above, but place particular focus on AI, autonomous technologies, and advanced computing in accordance with the Military Strategic Guideline on "intelligentised" warfare. AI is front and centre—the CCP has declared its ambition to become the global leader in AI by 2030—reflecting the leadership's belief that AI will revolutionise military affairs. One *PLA Daily* text underscores the need to develop "intelligent algorithms" capable of modelling complex combat scenarios and assisting commanders in innovating new warfare methods.[495] Other concepts, such as "Multi-Domain Precision Warfare," emphasise the use of advanced digital technologies to orchestrate precision strikes on automatically identified enemy vulnerabilities.[496] The current economic five-year plan (2021–2025) calls for strengthened innovation in defence S&T, with a focus on intelligentised weapons and strategic cutting-edge technologies through

485 Harting, et al. *Comparative Analysis of U.S. and PRC Efforts*, pp. 51–52.

486 Cheung. *The Chinese Defence Economy's Long March,* pp. 344–345.

487 Tang. The Logic of China's Careful Defense Industry Purge; Weinbaum, et al. *Assessing Systemic Strengths and Vulnerabilities*, p. 6.

488 Weinbaum et al. *Assessing Systemic Strengths and Vulnerabilities*, pp. 6, 28.

489 Cheung et al. *Planning for Innovation*, pp. 137–138.

490 Xinhua News Agency. Full text of Xi Jinping's report at 19th CPC National Congress (2017).

491 Meia Nouwens. China's Military Modernisation: Will the People's Liberation Army complete its reforms?. *Strategic Survey 2022* (IISS, December 2022), p. 53.

492 PRC State Council. *The Diversified Employment of China's Armed Forces* (April 2013).

493 Zhu Hongbo & Tao Chunxiao. Wealthy country, strong army and the Great Wall—Army representatives and members discuss the consolidation and improvement of the integrated national strategic system and capability [富国强军固长城— 军队代表委员热议巩固提高一体化国家战略 体系和能)力]. *PLA Daily* (11 March 2024).

494 U.S. Department of Defense. *Military and Security Developments* (2024), p. 152.

495 Chen Lei. Intelligent Algorithms: Accelerators of Warfare Innovation [智能算法：战法创新的加速器]. *PLA Daily* (7 November 2024).

496 U.S. Department of Defense. *Military and Security Developments (2024)*, pp. 35–36.

to 2035.[497] In addition to AI and related technologies, other prioritised areas include quantum sensing, military biotechnology, and electronic warfare weapons.[498]

It is not known how far development and production have progressed towards these goals in practice. Considering the twenty-year cycle of the CMC EDD's Weapons Equipment Development Strategy, a two-decade period is likely a reasonable general estimate for the time needed to research, develop, produce, and field new weapons systems. If the adoption of the Military Strategic Guideline on informatised warfare in 2014 is taken as a starting point, then, theoretically, 10 years in, some R&D initiatives should have moved beyond preliminary research into engineering and development—though likely not yet into batch production. This kind of speculation is of course difficult to confirm. The time required to turn an idea into an operational capability depends on the specific system, and available indicators can be contradictory. As for AI, recent research reveals that Chinese scholars are concerned about the PLA's ability to use AI-integrated military systems effectively and perceive a large gap between targeted capabilities and current technological realities.[499] Similarly, Elsa Kania assessed in 2017 that, to date, the PLA has succeeded in the introduction of information technology into platforms and systems; progressed gradually toward integration; and seeks to advance toward deeper fusion of systems and sensors across all services, theatre commands, and domains of warfare. However, the results of informatization have created new challenges in the effective processing and utilization of data. At this point, the PLA remains in the early stages of speculation and experimentation with AI that could enable deeper military innovation.[500]

Nonetheless, it is possible that the PRC will publicly demonstrate certain intelligent assets in the near future as a tactic to stoke national pride and patriotism. Researchers have noted that information about commissioned armaments has become increasingly accessible in recent years, as the PLA is displaying its most modern and technologically advanced weapons systems at high-profile events more frequently, for purposes of prestige signalling.[501] For this reason, defence expos, drills, and other military displays may offer clues about the PLA's technological direction, even if they are less credible as evidence of progress.

Despite China's advanced and, in certain areas, cutting-edge capabilities, full self-reliance remains a long-term goal. The defence-industrial base is certainly highly capable: the US DOD assesses that the PRC is largely "self-sufficient for all shipbuilding needs," capable of manufacturing high-end military platforms, and that its investments towards improving domestic production of aircraft engines appear to be paying off.[502] Still, there is some distance to go for full self-sufficiency. Insofar as China remains an importer of advanced defence technologies, domestic industry likely cannot yet fulfil all of the PLA's needs.[503] According to the national catalogue on encouraged technologies and products for import (updated most recently in 2017, as far as is publicly known), the Chinese government prioritises 212 specific advanced technologies that manufacturers should acquire from abroad and learn to recreate.[504] These centre on design and manufacturing technologies for gas turbines and precision manufacturing, as well as (AI-critical) super high-performance computers, large-capacity storage systems, and advanced integrated circuits. The catalogue also lists 162 types of industrial equipment needed for the manufacturing of satellites, motor vehicles, aircraft, ships, et cetera. In the case of aircraft, the 15-item list includes engine systems, landing-gear systems, aviation design software, and high-performance titanium alloy products, among others. Many of these technologies also feature in a 2018 article series on "chokepoint" technologies in the government-run newspaper *Science and Technology Daily*.[505] The catalogue of encouraged industries for foreign investment gives further clues into potential deficiencies of China's civilian, and presumably defence, industries.[506] Nonetheless, if lists like these are taken as evidence of

497 Xinhua News Agency. *Outline of the People's Republic of China 14th Five-Year Plan for National Economic and Social Development and Long-Range Objectives for 2035* (CSET, 2021).

498 U.S. Department of Defense. *Military and Security Developments* (2024), p. 26, pp. 151–152.

499 Sam Bresnick. *China's Military AI Roadblocks. PRC Perspectives on Technological Challenges to Intelligentized Warfare* (CSET, 2024).

500 Kania. *Battlefield Singularity*. Italics added here for emphasis.

501 Xiaoguang Wang. The "Techno-Turn" of China's Official Discourse on Nationalism. *Communist and Post-Communist Studies*. 43:4 (2020): pp. 220–239.

502 U.S. Department of Defense. *Military and Security Developments* (2024), pp. 149–151.

503 Weinbaum et al. *Assessing Systemic Strengths and Vulnerabilities*, p. 14.

504 National Development and Reform Commission. Announcement on the Public Consultation on the Catalogue of Technologies and Products Encouraged for Import (2017 Edition) [关于《鼓励进口 技术和产品目录（2017年版）》] (23 November 2017).

505 Ben Murphy. *Chokepoints: China's Self-Identified Strategic Technology Import Dependencies* (CSET, 2022).

506 Qian Zhou. China Further Expands the Encouraged Catalogue to Boost Foreign Investment. *China Briefing* (1 November 2022).

a lacking domestic capacity, Weinbaum et al. point out that, on the flipside, this means that China is self-sufficient in all or most other technological areas.[507]

While overcoming bottlenecks is a critical aspect of a strong defence industry, catching up with global competitors is not enough to achieve military dominance from a long-term perspective. At present, experts assess that China lacks the fundamental R&D capabilities, funding, and risk-taking attitude needed to achieve *and* convert technological breakthroughs into productivity improvements of the kind that will truly allow the PLA to overtake its adversaries.[508] Moreover, researchers suggest that some of the DIB's most impressive achievements (such as the J-20 fighter jet) would not have been possible without foreign expertise, legally (through purchases, mergers, and direct investments) and illegally acquired, and therefore do not accurately reflect China's true independent S&T ability.[509] Relatedly, China's spotlight approach to technology R&D—i.e. with a top-down and centrally controlled focus on a limited number of core areas—has been criticised for neglecting research topics and fields outside of the priority list and thus risking missing out on groundbreaking innovation in new or unexpected fields.[510] Still, the priority list is incredibly extensive, and Tim Rühlig points out that at least some of the state's investments are *statistically* bound to yield excellent results, simply because there are so many ongoing projects.[511] Finally, although sustaining a portion of civilian production is tactical to secure a diversified stream of revenue in case the demand for military production wanes, the SOEs' predominant share of non-defence production could limit their potential for military innovation by diverting their attention.

6.3 Implications for China's military power

A well-functioning, industrially and technologically capable, and innovative defence-industrial base is a central and crucial resource for achieving Xi Jinping's three milestone targets for the PLA's development through 2050. This section deliberates upon a few aspects of the DIB's utility to the PRC's military power buildup in peacetime. These aspects, alongside continued monitoring of changes to the DIB's organisational composition (including emerging actors, new divisions of labour, and ties within and between actor categories), are suggested areas for continued analysis.

The Party-state's commitment to improve the technological capacity of the defence sector seemingly creates favourable preconditions for the PLA to progress towards its army-building goals, if uninterrupted by major crises. While most of the challenges facing the Chinese defence industry are not uniquely Chinese, there are three central parameters—each of which is treated in turn below—to the DIB's continued performance that stand out as particularly interesting in the Chinese case:

- strategic guidance and political leadership;
- financial support;
- military-civilian fusion efforts, and defence market incentive structures.

Strategic guidance and political leadership

To achieve the stated goals, the Party-state needs to sustain a high level of attention to strategic guidance and political leadership. China has previously demonstrated it can achieve ambitious science and technology targets (e.g., developing nuclear weapons in the 1950s and 1960s and significantly raising the nation's S&T level between 2006 and 2020) under unfavourable economic circumstances; Xi has articulated his vision clearly. It will be important to observe which priorities the CCP highlights in economic planning, science and technology policies, and other strategic documents. Sinolink Securities, a Chinese investment company expects the forthcoming 2026–2030 economic five-year plan will assign utmost priority to defence acquisition.[512] This level of dedication will be necessary to reach the targets, and judging by the close discursive connection in national narratives between a modern military and a modern, revitalised nation, the leadership's motivation appears strong. If China falls short of its army-building targets in 2035 and beyond, it will likely not be due to a

507 Weinbaum, et al. *Assessing Systemic Strengths and Vulnerabilities*, p. 21.

508 Cheung. *Innovate to Dominate;* Jeffrey Ding. The diffusion deficit in scientific and technological power: Re-assessing China's rise. *Review of International Political Economy* 31:1 (2024): pp. 173–198.

509 Béraud-Sudreau and Nouwens. Weighing Giants.

510 Weinbaum, et al. Assessing Systemic Strengths and Vulnerabilities, p. 58.

511 Tim Rühlig. *The Sources of China's Innovativeness.* DGAP Analysis no. 5 (Berlin: German Council on Foreign Relations, 2023), p. 7.

512 Yang Chen, Wen Xiao & Ren Xuhuan. Defence industry 2025 strategy: a critical year of continuity, economic growth boom to be expected [军工行业2025年度策略： 承前启后关键年份，景气加速可期]. *Sinolink Securities* (24 November 2024): p. 11.

lack of political will, but rather to inefficient implementation and uncritical follow-up of earlier policymaking.

One potential issue lies with the CCP's apparent wariness to reform managerial inefficiencies more deeply than at the superficial level. One such area is the fight against corruption in the defence sector. Weinbaum et al. find that the removal of corrupt officials in the leadership of defence conglomerates is necessary; however, current anticorruption campaigns are shrouded in uncertainty and can be interpreted as purges of individuals the party deems disloyal or problematic, creating a paradoxical scenario in which "the anticorruption activities *are* the corruption."[513] Similarly, SASTIND's success in pushing through the corporatisation of business-oriented defence S&T institutes does seem relevant for improving SOEs' ability to commercialise research results. Yet, the ability to push a product quickly to market only creates tailwinds for defence modernisation if the marketed product genuinely corresponds to the PLA's needs. At present, there appears to be a risk that efforts are concentrated to areas where commercialisation is easiest, rather than where it is most urgently needed. While policy initiatives such as these appear justified, it is unclear how much these campaigns will affect the DIB's overall performance unless corruption and the opaque regulatory system, among other issues, are resolved.

Financial support

The national defence budget is a central element dictating the relationship between the DIB and the PLA. To keep the PLA's modernisation progress on schedule, a sustained level of acquisition funding is required—there is no point in funding 10 years of R&D if there are no funds to purchase the end products once ready for delivery. GDP growth patterns and defence spending trends go hand in hand, and state spending will have to become more restricted as economic growth slows down. Even if China can afford to maintain defence spending at the current level for a few more years, Weinbaum et al. suggest that Beijing faces the choice between investing in modernisation, or maintaining force readiness and sustainment.[514] To deal with this, China could reduce spending in other public domains or reallocate funds within the defence budget. Here, funds could be shifted from the personnel and training budget posts towards equipment spending at the end of the weapons development cycle (around 2035), when the simultaneous market launch of many new armaments may increase the economic burden on the acquisition system. However, given the complexity of intelligent assets, the learning curve for new weapons system could be steep, meaning that the importance of training increases with the fielding of new platforms. If the PLA is understaffed and has fewer opportunities for training with the new assets, the ramifications for exercising China's military power may be substantial.

Military-civilian fusion efforts, and defence market incentive structures

The state-led efforts in military-civil fusion have so far focused on creating mechanisms for private-sector firms to enter the defence market. However, Evron and Bitzinger observe that it is not only necessary to expose civilian firms to military opportunities; the CCP must also create and improve incentive structures and remove obstacles.[515] As long as private enterprises remain (informally or formally) restricted to contracts with poor profitability, they will not want to shift focus from their core commercial activities. Even if political pressure compels civilian firms to sell to the PLA, the fact remains that tech companies depend on profits to be able to reinvest in R&D—meaning that military-civilian fusion could have inverse effects on defence innovation as long as procurement deals remain lucrative only for the major actors. Relatedly, profitability of defence contracts appears to be a critical incentive to raise the SOEs' defence-order intake and investments in military R&D. Trends in arms imports and exports are other possible indicators of a supply-demand mismatch on the domestic procurement market.

6.4 Analytical outlook and concluding remarks

This chapter outlines an analytical baseline for understanding the significance of the defence-industrial base as a peacetime resource for China's military power. Future studies should continue to monitor the progress of the DIB's major actors, as well as potential changes to its organisational composition and to the PLA's procurement priorities. The latter follows from the CMC's threat perception and strategic direction, making an understanding of the motivational drivers in Chinese thinking about defence a critical input. Future studies may also further analyse the implications of the above-mentioned parameters for building China's military power

513 Weinbaum, et al. *Assessing Systemic Strengths and Vulnerabilities*, pp. 29–30. Italics in original.

514 Ibid., p. 11.

515 Evron & Bitzinger. *The Fourth Industrial Revolution,* pp. 118–119.

in peacetime. Additionally, conducting a deep-dive into the business operations, targets, deliveries, and actor networks of one of the defence-industrial sectors or a specific SOE could provide insights into the status of the PRC's defence modernisation.

As is true for all aspects of military power, the DIB's contribution to raising the PLA's warfighting capabilities in a conflict scenario, which, at the end of the day, is the ultimate cornerstone of military power and a credible military threat, depends on a range of contextual factors. Any assessment of the DIB's utility as a wartime resource demands knowledge (or a comprehensive set of assumptions) regarding the specific mission, operational environment, political context, and other contingency-specific conditions. These and other, known and unknown, variables will all affect the DIB's ability to continuously provide the armed forces with new armaments, equipment, and spare parts. Moreover, the DIB's ability to adapt quickly, flexibly, and creatively to unexpected operational requirements and new demands presents another unknown but critical skill to ensure that delivered arms present the PLA with an actual warfighting advantage.[516] It will be critical that the DIB is responsive to functionality challenges and changing campaign requirements, and is able to adapt its continued production and maintenance operations accordingly. This ability relates to the DIB's organisational makeup and linkages to the procurement organisations, the arms producers' innovation culture, managerial practices, bureaucratic processes, and regulatory environment, among other factors.[517] These aspects could be included in studies exploring China's military power in a specific wartime scenario. ■

516 See Theo Farrell, Frans Osinga & James A. Russell (eds.). *Military Adaptation in Afghanistan* (Stanford: Stanford University Press, 2013); Michael C. Horowitz & Shira Pindyck. What is military innovation and why it matters. *Journal of Strategic Studies* 46:1 (2023): pp. 85-114.

517 Tai Ming Cheung. A conceptual framework of defence innovation. *Journal of Strategic Studies* 44:6 (2021): pp. 775-801.

7. Concluding remarks and the way forward

Oscar Almén and Christopher Weidacher Hsiung

In addition to summing up some of the main points from the report, this final chapter outlines a tentative plan for future studies of China's military power. Three broad concluding observations can be drawn.

First, as we noted in the introduction, this report is the first study in a planned series of reports from FOI's Asia programme, part of a broader and long-term research project on how to understand China's military power and its implications for Sweden. The intention with this first report has been to lay the groundwork for future reports by addressing conceptual, theoretical, and methodological issues, and specifying our approach to analysing China's military power. We again emphasise that some revisions and improvements are to be expected once the framework is applied in combination with empirical research.

However, it is our hope that the core of the analytical framework and methodological approaches can be maintained in order for future studies to focus more on empirical research on China's military power. By keeping the same analytical framework we aim to enable comparisons over time of how China's military power develops. It should be added that while the analytical framework has been developed on a generic level, we admittedly had China specifically in mind.

A core ambition for the future is to provide a Chinese perspective, i.e. how the Chinese themselves conceptualise and think about the use of military power. Some questions to explore more systematically include: How does the Chinese side view its own and other nations' military power? What are their main threat perceptions? How does the Chinese military perceive and deal with challenges such as corruption and lack of experience in the PLA? In addition to exploring such questions, it is advisable to have an open mind and approach the data inductively. As the chapter on methods shows, there is a wide range of methods and data on how to study military power, and China's in particular. Different research methods are thus suitable for different research issues. This will require a degree of methodological flexibility and in some cases innovative ways to access and assess data. This is especially crucial in the study of China's military power, which constitutes a particularly sensitive subject in an authoritarian setting.

Second, the overview of previous research on China's military power, while far from exhaustive, presented in Chapter 3 provides us with a point of reference for overarching themes relevant to the study of China's military power and a broad starting point for future research. The overview finds that research on Chinese military affairs has grown increasingly abundant in scope. It examines factors of Chinese military power and the PLA's capabilities in both broad terms as well as in narrower dimensions of the PLA's different services. Not only does it engage with the PLA's hardware capabilities, but it also looks into intangible factors such as culture, experience, and knowledge within China's military ecosystem. Importantly, China's military is assessed by most analysts to have significantly strengthened its capabilities in the past decades, but there are also crucial weaknesses and challenges identified in the literature, such as its lack of combat experience or capabilities in undertaking joint operations. Moreover, although the research has come a long way in studying China's military, there is still much that needs to be further studied and analysed for understanding China's military power—both in obvious areas such as the modernisation of its force structure, as well as non-material issues such as, for example, China's ideational fundaments and thinking regarding its use of military resources and power, as just noted.

The wealth of research on different aspects of China's military power that experienced experts have produced over the years is of course crucial for our study. Any study would have to start with what other analysts have found, but it is equally important to maintain a critical perspective, especially regarding the possible explicit or implicit assumptions made by other researchers, as well as one's own assumptions. Military power is a contentious issue that easily opens up to normative interpretations based on ideological, cultural, and political values. What conclusions are made can have a direct impact on the policy choices pursued. It is thus crucial to assess China's military power appropriately (as best as possible),

both its strengths and weaknesses, in order to arrive at a sound methodological and well-researched analysis.

Third, as recalled, we included two empirical chapters as a way to illustrate potential individual chapters of future studies. While these two chapters offer limited data for making an overall assessment of China's military power in line with our ambition set forth by the analytical framework, some overall conclusions can be drawn from those two chapters in particular.

Chapter 5 describes the rapid and comprehensive military modernisation of the PLA. During the last two decades, the PLA has been transformed from an outdated and underfunded force to a modern military force with state-of-the art equipment. The rapid expansion of its surface navy and current build-up of stealth fighters are some prominent examples. However, China still only spends about a third of what the US spends on its military, and the PLA still lags behind the US Armed Forces in several key areas, such as combat aircraft, command and control assets, aircraft carriers, and nuclear submarines. On the other hand, China has steadily been decreasing the military spending and technology gaps with the West during the past two decades. Moreover, while questions remain concerning the exact performance of Chinese military equipment, China is increasingly displaying more advanced designs with greater degrees of domestic innovation. The military modernisation of the PLA is still very much an ongoing process, with the CCP leadership aiming to have a world-class military by 2049. As these ambitions remain unchanged, so too will the efforts continue.

A key takeaway from Chapter 6 is that the Party-state's commitment to improve the technological capacity of the defence industry creates favourable conditions for the PLA to achieve its army-building goals, if uninterrupted by major crises. PLA rhetoric especially emphasises innovation, science, and technology as the core of military power, with a strong interest in particular in emerging and disruptive technologies such as artificial intelligence (AI), advanced microelectronics, quantum information, neuroscience, space, and deep-sea technologies. Still, the path ahead is not without challenges. The difficulties facing the Chinese defence sector in terms of policymaking, sustained funding, and defence market incentive structures are not unique to the PRC. Yet, to sustain momentum, solutions tailored to address the root of the issues may be uncomfortable to the CCP but nonetheless necessary to avoid pushing bottlenecks around to elsewhere in the system.

We end this concluding chapter by providing a tentative outline for our next report. The upcoming report will contain more empirical chapters than the current one, with the aim of aligning with the conceptual discussion and analytical framework presented in this report. It is important to emphasise, however, that the outline is so far only tentative and intended to indicate an estimated picture of how our next report might be designed. Developments and events regarding China's military power, including the CCP and the PLA and their relations to the world, can force us to revise both the analytical approach and the empirical focus.

Tentative outline of the next report on China's Military Power

Chapter 1: Introduction: Aim, methods and analytical framework

Resources
Chapter 2: China's armed forces
Chapter 3: The defence-industrial base
Chapter 4: Economy and military expenditure

Perceptual inputs
Chapter 5: Threat perceptions and national security strategy

Conditional factors
Chapter 6: Doctrine and operational concepts
Chapter 7: Governance and civil-military relations
Chapter 8: Training and military exercises
Chapter 9: Foreign defence cooperation and strategic partnerships

Chapter 10: Conclusion: A comprehensive analysis of China's military power

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China is rapidly improving its military capabilities, transforming the People's Liberation Army (PLA) into an increasingly sophisticated and capable force. How China continues to develop its military power, how it thinks about the use of force, and how it seeks to employ military means to achieve broader political and strategic objectives will significantly shape global security and international politics in the decades to come.

This report designs an analytical framework for studying and assessing military power in general and China's military power in particular. It provides a discussion of research methods and presents an overview of the existing field of research on China's military and the PLA. The report also includes a description of the PLA's force structure and equipment and China's defence-industrial base.

The overarching aim of the report is to establish a conceptual and methodological foundation for a forthcoming and recurring report series on the study of China's military power by FOI's Asia programme.

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ISSN 1650-1942

www.foi.se