

Universidade do Minho
Escola de Economia e Gestão

Muhammed Can

Artificial Intelligence as a Resource: An Appraisal of China's Mobilization and Extraction Strategies

September 2024

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UMinho | 2024

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Ph.D. Thesis in Political Science and International Relations

A research conducted under the supervision of
Professor Alena Vysotskaya Guedes Vieira

September 2024

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Acknowledgment

I would like to extend my deepest gratitude to my supervisor, Professor Alena Vieira at the University of Minho, for her unwavering support and invaluable guidance throughout the process of developing this thesis. I am equally thankful to my friends Mohammad Eslami, also at the University of Minho, and Maria Papageorgiou at the University of Exeter, with whom I have had the pleasure of exchanging ideas and learning a great deal. Lastly, I am appreciative of the opportunity provided by the University of Minho to undertake this research. Thank you for making this thesis possible.

Muhammed Can
Fall 2023

STATEMENT OF INTEGRITY

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Artificial Intelligence as a Resource: An Appraisal of China's Mobilization and Extraction Strategies

Abstract

Building upon advancements in Artificial Intelligence (AI), this dissertation offers a comprehensive examination of Chinese AI policy, situated at the intersection of historical, political, and technological developments. The present dissertation introduces an innovative framework for analyzing and conceptualizing the resources integral to AI development, focusing specifically on data, algorithms, and computational capabilities.

The present thesis delves into China's strategies for resource mobilization and extraction from 2012 to 2023, employing a theoretical approach termed as 'Neoclassical State Action Theory,' which merges State Action Theory with Neoclassical Realism.

This framework is applied to assess resource mobilization and extraction at both domestic and international levels. Domestically, techno-nationalism is identified as a key factor (domestic intervening variables) of China's AI policy, driving primarily resource mobilization and extraction efforts.

The present thesis also underscores the impact of systemic variables, strategic environments, and systemic clarity in evaluating China's AI development strategies. On the domestic front, the dissertation highlights the critical role of data as a resource for AI development, noting that China's data extraction strategies often overlook data privacy regulations due to national security and regime stability concerns, particularly in regions like Xinjiang.

In the same vein, at the international level, the present dissertation explores China's Digital Silk Road initiatives and standard-setting efforts as pathways for external validation. It concludes by analyzing China's external resource extraction strategies, which are facilitated through various economic mechanisms aimed at knowledge transfer and talent acquisition, with the goal of bridging the resource gap with the United States.

This dissertation thus contributes to a nuanced understanding of China's complex AI strategy, illuminating the intricacies and unique aspects of its resource mobilization and extraction strategies at both domestic and international levels.

Keywords: Artificial Intelligence, China, Extraction, Mobilization, Resource

Inteligência Artificial como um Recurso: Uma Avaliação das Estratégias de Mobilização e Extração da China

Resumo

Baseando-se nos avanços da Inteligência Artificial (IA), esta dissertação oferece um exame abrangente da política chinesa de IA, situada na interseção de desenvolvimentos históricos, políticos e tecnológicos. A presente dissertação introduz uma estrutura inovadora para analisar e conceituar os recursos integrais ao desenvolvimento da IA, focando especificamente em dados, algoritmos e capacidades computacionais.A presente tese aprofunda-se nas estratégias da China para mobilização e extração de recursos de 2012 a 2023, empregando uma abordagem teórica denominada "Teoria da Ação Estatal Neoclássica", que funde a Teoria da Ação Estatal com o Realismo Neoclássico.Esta estrutura é aplicada para avaliar a mobilização e extração de recursos tanto em níveis domésticos quanto internacionais. No âmbito doméstico, o tecno-nacionalismo é identificado como um fator-chave (variáveis intervenientes domésticas) da política de IA da China, impulsionando principalmente os esforços de mobilização e extração de recursos.A presente tese também sublinha o impacto de variáveis sistêmicas, ambientes estratégicos e clareza sistêmica na avaliação das estratégias de desenvolvimento de IA da China. No front doméstico, a dissertação destaca o papel crítico dos dados como um recurso para o desenvolvimento da IA, observando que as estratégias de extração de dados da China frequentemente ignoram regulamentações de privacidade de dados devido a preocupações com segurança nacional e estabilidade do regime, particularmente em regiões como Xinjiang.Na mesma linha, no nível internacional, a presente dissertação explora as iniciativas da Rota da Seda Digital da China e os esforços de definição de padrões como caminhos para validação externa. Conclui analisando as estratégias de extração de recursos externos da China, que são facilitadas por vários mecanismos econômicos visando a transferência de conhecimento e aquisição de talentos, com o objetivo de preencher a lacuna de recursos com os Estados Unidos.Esta dissertação, portanto, contribui para uma compreensão nuançada da complexa estratégia de IA da China, iluminando as complexidades e aspectos únicos de suas estratégias de mobilização e extração de recursos tanto em níveis domésticos quanto internacionais.

Palavras-chave: China, Extração, Inteligência Artificial, Mobilização, Recurso

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List of acronyms

AFST	Allegheny Family Screening Tool
AGI	Artificial General Intelligence
AI	Artificial Intelligence
AIIA	Artificial Intelligence Industry Alliance
AIOIP	Artificial Intelligence Open Innovation Platform
AUKUS	Australia, United Kingdom, United States
AWS	Autonomous Weapons System
BC	Before Christ
BRI	Belt and Road Initiative
BRICS	Brazil, Russia, India, China, South Africa
CAC	Cyberspace Administration of China
CAS	Chinese Academy of Sciences
CCP	Chinese Communist Party
CIA	Central Intelligence Agency
CINC	Composite Index of National Capability
COP	Community of Practice
COVID	Coronavirus Disease
CPSU	Communist Party of Soviet Union
CPTPP	Comprehensive and Progressive Agreement for Trans-Pacific Partnership
CPU	Central Processing Unit
DARPA	Defense Advanced Research Projects Agency
DNA	Deoxyribonucleic Acid
DSR	Digital Silk Road
ET	Emerging Technologies
EU	European Union
FDI	Foreign Direct Investment
GCI	Global Civilization Initiative
GDI	Global Development Initiative

GDP	Gross Domestic Products
GDPR	General Data Protection Regulation
GPAI	Global Partnership on Artificial Intelligence
GPS	Global Positioning System
GPT	General-Purpose Technology / Generative Pre-Trained Transformer
GPU	Graphic Processing Units
GSI	Global Security Initiative
HIDZ	High-Tech Industrial Development Zone
HPC	High-Performance Computing
IC	Intelligence Community
ICT	Information Communications Technology
IJOP	Integrated Joint Operations Platform
IPE	International Political Economy
IR	International Relations
JV	Joint Ventures
LLM	Large Language Models
M&A	Mergers and Acquisitions
MIIT	Ministry of Industry and Information Technology
MoST	Ministry of Science and Technology
NATO	North Atlantic Treaty Organization
NDRC	National Development and Reform Commission
NGAIDP	New Generation Artificial Intelligence Development Plan
NKP	National Key Research and Development Programs
NLP	Natural Language Processing
NSFC	Natural Science Foundation of China
OECD	Organisation for Economic Co-operation and Development
OSINT	Open-Source Intelligence
PLA	People's Liberation Army
QUAD	Quadrilateral Security Dialogue
R&D	Research and Development
RMA	Revolution in Military Affairs

SEZ	Special Economic Zone
SME	Small and Medium-sized Enterprise
STEM	Science, Technology, Engineering, Mathematics
STS	Science and Technology Studies
TPU	Tensor Processing Unit
UN	United Nations
US	United States
VCI	Venture Capital Investment
WTO	World Trade Organization

List of Chinese Terms (Pinyin)

Baojia	Collective neighborhood system
Chaoying Ganmei	Exceed the United Kingdom and catch up with the United States
Dang'an	Secret archives to document citizens' performance and attitudes
Danwei	Chinese socialist workspace
Gaige Kaifang	Opening up and reform
Ganchao	Catch up and surpass
Hukou	Population registration system
Liangdan Yixin	Two bombs one satellite
Renmin Ribao	People's Daily (Official Newspaper)
Xueliang Gongcheng	The sharp eyes project

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Dedication

"It is not death that a man should fear, but he should fear never beginning to live" (Marcus Aurelius-Meditations)

In the velvety darkness of night, we nocturnals have an expanse of time to ponder life's riddles—a solitary stage where our thoughts dance. I, like you, have cobbled together my own patchwork theory or I might say a thought experiment, of what life means. It is an odyssey, really—a long and short at the same time, a phantom time perhaps, winding journey filled with victors and vanquished, the resonances of love and echoes of hatred, a paradoxical mix of peace and war, challenge and stagnation. But, remember, these elements, as disparate as they are, serve as reminders on our long odyssey, yet short at the same time; each a fleeting signposts that our hearts still pulse, that we are more than just passing shadows. We are alive, and for that, there is a subtle yet profound gratitude. As I sit here penning these sentences, understand that it is not the accomplishment of surviving the crucible of this Ph.D. thesis that fills me with gratitude. Rather, it is the totality of experiences, of lifetimes lived in moments, that have led me to this very point. And so, in the quiet that envelops me now, let me share with you a fragment of my own tale.

The country from which I originate is a place that arouses deep affections within me, yet it is a land where life's complexities belie easy categorizations. When I found myself on Portuguese shores, it was not merely to fulfill some academic ambition or to cross off a country from a long-standing list of goals. Rather, Portugal presented itself as a setting where I could escape, even momentarily, a history too burdensome to encapsulate within these limited pages. There was an episode, —a political maelstrom in post-2016, set off by Erdogan's arbitrary actions—that swept me, along with countless innocent souls, into an existence fraught with instability and despair. With a sole decree, I was abruptly robbed of my professional occupation, thrust into a world where subjective judgments shaped my life and the lives of those I held dear.

In that light, Portugal transformed into something beyond a backdrop for scholarly pursuits; it became a refuge, offering the promise of rejuvenating a spirit grown weary from trials. Portugal has thus evolved into what I sincerely consider my second homeland, a term that gains increasing resonance when one confronts the closure, whether by choice or circumstance, of one's original home. Indeed, when one's

first home ceases to be an accessible sanctuary, the second takes on the elevated role of becoming the primary dwelling for one's heart. Portugal, with its rich culture and welcoming people, became more than just a pin on my world map; it became a sanctuary for my soul. From 2019 until this minute, a fleeting moment that is here and then gone, I have connected with so many individuals, each leaving a distinct imprint on my life.

But life's playlist is not made up merely of uplifting tracks. For every moment of harmony, there is a counterpoint of loss. And so, I dedicate this thesis to two irreplaceable woman who are no longer with us. First, my grandmother, Naciye Erdogan, who passed away not long after my Portugal journey began. Grandma, I promised you I'd see this through, and here I am, at the end of this particular road. May you rest in peace, in a place where time is endless and worries are few.

Second, to Sıla, whose life was cut tragically short at 27. The story we could have shared was interrupted, leaving an emptiness like an unfinished novel. Rest in peace, Sıla. Wherever you are now, I hope the story continues in a realm we can not yet see. I must express my gratitude to the women who have been the pillars of my journey. To my mother, Fatma, who has been a guiding star; my sisters, Nesibe and Merve, who have been my constant companion; my nieces - Melis, Melek, Ezgi and my nephew Turgay Eray - sources of boundless joy; and my beloved friend, Zeynep, and indeed Aimira, among several others whose names escape me at this moment. Your faith in me has been unshakable.

To my father, Ahmet Cetin, and my brothers, Muhlis Can, and Latif Cakır your success in your professional career illuminated the path for me. Thank you for setting the course.

A heartfelt thank you to those close friends I am fortunate to call brothers: Muhlis, Halid, Eren, and Sefa. Your support has been unwavering. And to Patrick, Jaivir, Leticia, and Gessica - each one of you has played a significant role in shaping my journey. My gratitude knows no bounds. Finally, it would be remiss of me not to dedicate this thesis to my enduring idol, Mustafa Kemal Atatürk. It was under the auspices of legislation he championed that I received the scholarship enabling my professional journey abroad. His visionary leadership continues to serve as an inspiration to me. Rahat uyu Atam! Evladın izinde. Bir ölür, bin diriliriz...

Muhammed Can

Fall 2023

Chapter 1: Introduction

1.1 Why study artificial intelligence from an International Relations perspective?

It is infrequent for a single technology to significantly influence the course of human civilization or to consistently ignite discussions about its management. Though Artificial Intelligence (AI) is not a new phenomenon, developments in recent decades particularly in machine learning thanks to the groundbreaking approach in computer vision proposed by Krizhevsky et al., (2017) paved the way for new interdisciplinary approaches that aim at measuring total impacts of AI. First question is arising at this point whether AI can be considered as general-purpose technology (GPT). In other words, can AI be a technology resembling electricity, internet, medicine, railroad or steam engine? (Crafts, 2021; Klinger et al., 2018). Considering otherwise would be futile given the vast array of applications of AI in our daily lives that runs gamut from healthcare to the social media platforms (Jiang et al., 2017; Davenport, 2019; Ozbay and Alatas, 2020; Natale, 2021).

AI holds the promise of significantly reducing labor costs through extensive automation capabilities. It boasts versatility, with integration potential across diverse tools – from vehicles and residences to industrial machinery. In analytical domains where human cognition may falter, particularly due to the sheer volume of data and variables, AI proves indispensable. Its prowess extends to medical diagnostics, the discovery of novel pharmaceutical drugs, and the creation of content through Large Language Models (LLMs). Popular generative tools such as Open AI's GPT-4 (Generative Pre-trained Transformer) and Google's Bard stand as testament to this innovative leap.

As AI's capabilities expand at an exponential rate, the technology has given rise to an increasingly complex set of challenges. Indeed, as with every technological advancement, AI carries its own set of costs, which might be borne by states, societies, individuals, and even the environment, considering the significant resources consumed by AI models (Galaz et al., 2021; Roff, 2019; Ryan, 2022; Scherer, 2015; Johnson, 2021).

Notably, the specter of widespread job losses due to large-scale automation looms large, as do ethical concerns surrounding algorithmic bias related to gender and race. When contemplating the trajectory of future economies in the context of AI-driven automation, a myriad of considerations arises. For instance,

there are concerns about AI's potential to replace not just manual, blue-collar jobs but also specialized, white-collar professions such as medical diagnostics. Proliferation of AI-based tools has been predicted to precipitate reductions in employment rates and average wages (Acemoglu and Restrepo, 2020), especially in sectors most susceptible to robotic assimilation at the community level. In parallel, it has been proposed that while AI might pave the way for unparalleled opportunities in emerging economies, it could also imperil the nature of work as we understand it today (Ernst et al., 2019). One avenue to counterbalance the potentially negative repercussions of AI is the enhancement of workforce skill sets. By doing so, it is conceivable that the transition to a heavily automated landscape can be more seamless and inclusive (referencing Benhamou, 2020; Bughin, 2020; West, 2018).

Furthermore, the potential for existential risks becomes palpable should the development of artificial general intelligence reach fruition. Complicating matters further is the dual-use nature of AI, which has both military and civilian applications. This complex balance of benefits and drawbacks is so multifaceted that even non-state actors, primarily private companies, find themselves ill-equipped to regulate AI's ethical and proportionate use effectively. Such complexities have necessitated state involvement in AI development, not merely for regulatory oversight but also to harness its economic and military potential, particularly in the realm of autonomous weapons. Yet, capitalizing on both the economic and military potentials of AI necessitate that states seize the first-mover advantage. Recognizing this imperative, nations, irrespective of their development status, have redoubled their efforts to recalibrate their economies in alignment with this technological frontier (citing Paltieli, 2022; Phillbeck & Davis, 2018; Schwab, 2017; Xu et al., 2018).

As of 2023, four primary factions have emerged in the national AI strategy landscape, although most of these strategies share commonalities, with differences primarily in prospective regulations and approaches to ethical challenges posed by AI (Can, 2022; Can and Kaplan, 2020). Indeed, depending on the research agenda or scientific priorities, these strategies can be classified under various labels (Fatima et al., 2020). However, it is evident that the three dominant players in the AI realm are the US, China, and the EU, each exemplifying unique pathways of AI development (See Figure.1). The EU, for instance, emphasizes a human-centric AI approach, focusing on creating systems that minimize risks potentially detrimental to society, Chinese “government promotes domestic competition and funds emerging winners as national champions” while the US AI development “relies on a more disparate set of private actors (Schmidt, 2023, para. 23). In the meantime, major global powers, particularly China and the US, have been embroiled in intense technological competition. Through various mechanisms

like export bans, restrictions, and escalating tariffs, this rivalry has ignited extensive academic debate, prompting discussions about whether the global system is on the cusp of a 'tech cold war'.

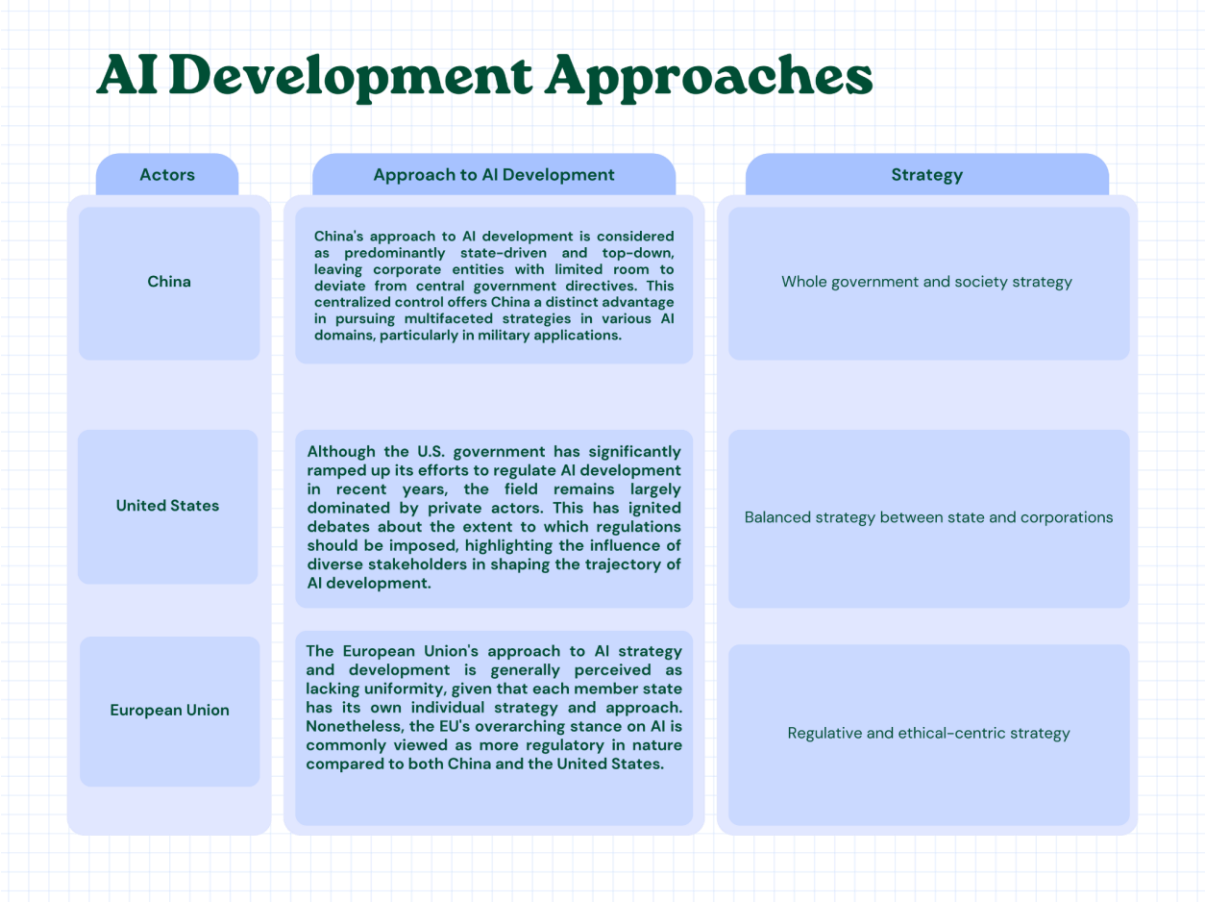


Figure.1 AI development approaches (Source: Author's compilation)

According to the OECD's data, there have been 800 AI policy initiatives, encompassing national AI strategies and regulations up to 2022. But the pressing question is, why has AI suddenly surged to prominence after years of being overlooked, especially in STEM (Science, Technology, Engineering and Mathematics) disciplines, not to mention interdisciplinary standpoints? While undeniable advancements in machine learning, computing, and the explosive growth in data play a part in this development, it is imperative to adapt the International Relations perspective given global political impacts of AI. This would help discern the transformative potential of AI for states in the forthcoming decades, a need highlighted by scholars like Geraci (2010), Nilsson (2009), Savage (2020), and Xu (2019).

Furthermore, the impact of AI on global politics is profound and could potentially reshape the entire international political structure if the expected developments are realized in the upcoming decades. As Schmidt (2023, para.7) asserts:

"In previous eras, the technologies that shaped geopolitics —from bronze to steel, steam power to nuclear fission—were largely singular. There was a clear threshold of technological mastery, and once a country reached it, the playing field was leveled. Artificial intelligence, by contrast, is generative in nature. By presenting a platform for continuous scientific and technological innovation, it can lead to yet more innovation"

The crux of the matter lies in the notion of being 'generative' that sets artificial intelligence apart as an unprecedented technology among its peers. Consider for instance, the invention of steam engines, which was revolutionary or railways, which significantly enhanced rudimentary transportation systems. However, unlike AI, no steam engine or train could reproduce its kind. Therefore, AI represents a unique example, unlike previous revolutionary technologies, and the future of AI development remains largely unpredictable.

The inherent unpredictability in the development trajectory of AI, along with escalating state investment, a competitive race for global AI dominance, and the technology's broad-spectrum disruptive impacts, accentuates the strategic imperative of both theoretical and empirical investigation of AI. These complexities are further compounded by the interplay among diverse stakeholders—including nation-states, civil society, and large technology corporations. Given these multifaceted challenges and opportunities, an in-depth exploration of AI is requisite, meriting scholarly inquiry grounded in the field of International Relations.

1.2 Research question and main objective

Should AI be as disruptive and strategic as its impacts suggest, spanning various fields from the economy and politics to military and national security, then it becomes imperative to thoroughly investigate how states are approaching AI development. Indeed, state involvement, in isolation, cannot be the sole determinant of AI's trajectory, especially considering the predominant and pioneering role of major tech corporations. While these tech giants wield significant influence over AI's direction, regulatory measures, like the EU's Digital Service Act (European Commission, 2023), have the capacity to direct and constrain their actions. This regulatory authority takes on an even more pivotal role in countries like China, where the central government has the capacity to significantly shape the actions of leading technology firms. For such states, AI is not merely an instrument to reshape their economic and military landscapes; it is also emblematic of a power that they can seamlessly weave into both their

technological and broader foreign policy frameworks. However, to effectively incorporate AI into their tech strategies and, more expansively, their foreign policies, states must have robust mechanisms in place to drive AI advancement. Central to this is their ability to mobilize and extract resources effectively. In this context the present thesis seeks to respond the following Research Question:

How has China designed and implemented its strategy towards Artificial Intelligence in order to mobilize and extract respective resources?

Central objective of this thesis is the exploration of China's mobilization and extraction strategies within its AI policy framework. The main argument of the dissertation is that China has adopted a particular approach, characterized by a distributed mobilization strategy approach.

Employing neoclassical state action theory, the study aims to construct a coherent framework through which AI policy can be analyzed from an International Relations perspective. This focus is further refined by an endeavor to unravel the interwoven processes and relations underpinning AI policy in China, where the pivotal role of the central authority—the Chinese Communist Party (CCP)—exerts a profound influence both domestically and on the global stage [1].

The time frame of this thesis is delineated between the years 2012 and 2023, a period chosen based on a tripartite rationale. Firstly, 2012 signifies a pivotal moment in modern Chinese history, marked by Xi Jinping's coming to power both as General Secretary of the Chinese Communist Party (CCP) and President of the People's Republic of China. This inaugurated an era characterized by intensified debates on China's ascent and increasing visibility of its technology policies on both domestic and global stages. Second, this period coincides with a seminal phase in the development of AI, with machine learning applications achieving mainstream prominence, as exemplified by the 2012 computer vision competition and subsequent pioneering work, notably that by Krizhevsky et al. in 2017. Third, this timeframe encompasses a transitional epoch in the global perception of China; discussions shifted from queries of its 'peaceful rise' to strategies for counterbalancing its burgeoning influence, especially in the realm of technology (Khong, 2013; Rosecrance, 2006; Taylor Fravel, 2010) This shift has been accentuated by a recalibration in US policies towards China, manifested in initiatives such as export bans and restrictions, which have been interpreted by the CCP as aggressive countermeasures.

[1] In this thesis, terms such as the CCP, governmental bodies, and local governments are used interchangeably, as stated also in the methodology section. This, indeed, interchangeable usage reflects the interconnected roles these entities play in the formulation and implementation of China's AI strategy.

Against this background, the chosen time frame offers a particularly rich vantage point for analyzing China's strategies in AI development, specifically in terms of resource mobilization and extraction. Moreover, while the thesis is anchored in this time frame, 2012- 2023, it frequently traverses beyond these temporal confines to examine foundational strategies and practices—such as CCP's long-standing mobilization tradition—. This approach allows to demonstrate a strategic continuum irrespective of political transitions and seminal historical events like the Great Leap Forward, the Cultural Revolution, and the Opening Up and Reform era. A historical lens not only illuminates the evolutionary trajectory underpinning China's technology policy but also provides crucial context for understanding the complex dynamics of the chosen time frame, a theme further elaborated upon in Chapter 5.

1.3 Theoretical approach: Neoclassical state action theory

The present thesis undertakes a comprehensive examination of China's resource mobilization and extraction strategies within its AI policy framework, employing an analytical lens that synthesizes neoclassical realism and state action theories into the neoclassical state action theory.

The originality of present dissertation resides in the systematic application of the neoclassical state action theory to the China's AI policy, which is to the best knowledge to the author, the first doctoral-level study to employ a such an approach of Neoclassical Realist and state action theories specifically in the context of China's AI policy. While earlier works such as those by Leung (2019), Lee (2020), and Gutierrez (2020) have contributed to the debates on AI policy and technology more broadly, they employ different conceptual frameworks[2]. Therefore, this thesis fills an academic gap by introducing a novel approach that examines China's AI policy through the lens of resource mobilization and extraction, thereby bridging disparate threads of scholarly inquiry [3].

It should also be noted that state action theory is not a standalone meta-theory but draws its foundational premises from neoclassical realist theory. As such, the two theories are not mutually exclusive but instead function in a complementary manner, especially when applied to a subject as multifaceted and complex as China's AI policy. This combined theoretical approach thus offers a nuanced framework of analysis for dissecting and understanding China's strategies in the realm of artificial intelligence.

[2] For instance, Leung (2019) examines AI's role as a GPT and explores the historical interplay between private actors and states in the development of various technologies while Gutierrez (2020) scrutinizes the role of technology from a Neorealist perspective.

[3] These are notably artificial intelligence, Chinese technology policy, mobilization and extraction respectively.

The justification for merging Neoclassical Realist Theory and state action theory into a unified analytical framework is twofold. Firstly, although neoclassical realist theory addresses the mobilization and extraction of resources as a central component of a state's foreign policy along with its distinct domestic and external variables such as strategic environment and systemic clarity, it lacks the depth of focus on the specific mechanisms of resource mobilization and extraction that state action theory provides. In other words, while neoclassical realist theory highlights the importance of mobilization and extraction of resources, it falls short of detailing how states actually execute them. Secondly, although state action theory offers valuable insights into the rationale behind a state's strategies for resource mobilization and extraction, it does not adequately address the systemic and domestic variables that significantly shape a state's policies. Hence, to construct a robust analytical framework suitable for the examination of China's AI policy, the present thesis integrates these two complementary theoretical perspectives.

While Chapter 3 of the present thesis offers a comprehensive analysis, it is possible to employ various International Relations theories that can be applied to dissect China's AI policy. Other theories of International Relations might adequately explain certain facets of China's AI policy. However, they fall short in concurrently addressing both systemic and domestic perspectives intrinsic to this policy. To facilitate a more encompassing analysis consistent with the thesis's central objective—examining the intertwined relationship of domestic and systemic variables—the current study adopts a combined approach of neoclassical realist and state action theories, termed within this thesis as the neoclassical state action theory. Consequently, the selected theoretical framework, which combines neoclassical realist and state action theories, is deemed the most appropriate for systematically examining state-level strategies for resource mobilization and extraction, especially in sectors where emerging technologies like AI hold strategic significance. This approach not only enables a nuanced analysis of China's AI policy but also allows for the integration of both systemic and domestic variables, thereby providing a more holistic understanding of the subject matter. Given the emphasis on states as the primary actors in this theoretical framework, the mobilization and extraction of resources are predominantly undertaken by state entities.

1.4 Methodology

Given the evolving and dynamic nature of AI, it consistently welcomes novel methodologies and concepts. However, for clarity within this thesis, it is essential to establish foundational definitions. Predominantly, the terms AI and machine learning are used interchangeably in the thesis. Although AI

encompasses a broader spectrum, in the context of this work, AI largely pertains to machine learning. A more detailed exploration of this definition is provided in Chapter 4. In the same vein, concepts such as resource, mobilization, and extraction have specific connotations within this thesis, which are elaborated upon in Chapter 4.

Furthermore, while the Neoclassical state action theory refers to the state as a central actor, the present dissertation pays special attention to the strategies of mobilization and extraction of both the CCP, local governments, and other relevant governmental bodies. While CCP's mobilization of resources occurs directly, delegation of authority to local governments render mobilization into a dispersed process which makes Chinese mobilization of a particular kind indirect. For this reason, CCP and all the mentioned relevant actors are being addressed interchangeably.

Incorporating realism as its research philosophy, this thesis is ontologically foundationalist yet epistemologically relativist which the present thesis contends that "not all social phenomena, and the relationships between them, are directly observable. There are deep structures that cannot be observed ... Although we cannot observe those structures positing their existence gives us the best explanation of social action" (Marsh and Furlong, 2002, p.30).

Furthermore, the present thesis employs a qualitative methodology to examine China's AI policy, focusing specifically on the mechanisms that China utilizes for resource mobilization and extraction. While it is conceivable to analyze the chosen case study using a positivist, thus quantitative approach (or even a mixed methodology), such an approach might inadequately capture the nuances of how China mobilizes and extracts resources[4]. For instance, using government AI funds and investments as a primary resource metric might offer only a superficial glimpse into Chinese AI policy. Two significant challenges emerge here:

First, obtaining reliable data poses a significant challenge, primarily because of the information control in China and the classification of certain datasets. This could potentially trap the research in a quagmire of incomplete or misleading data.

Second, even if one were to successfully gather comprehensive data on government funding and investments, this would not allow for a complete picture of the strategies China employs to mobilize and extract resources. More critically, a purely quantitative approach would fall short of illustrating how

[4] Indeed, this does not imply that the current dissertation eschews quantitative data. Instead, it suggests that the underlying logic of inquiry is rooted in qualitative methodology.

China's AI policy is entwined with its broader technological ambitions on the global stage. Additionally, it would not illuminate the influence of domestic factors, such as techno-nationalism in this thesis, on China's resource mobilization and extraction strategies.

Within the confines of this thesis, given that the neoclassical state action theory serves as the primary theoretical framework, the research type adopted is predominantly deductive. The methodology of this thesis adopts a 'most-likely crucial case study' design, premised on the concept of inverse Sinatra inference, as characterized by Levy (2008, p.12): "If I cannot make it there, I cannot make it anywhere". Moreover, it is worth noting that crucial case studies are proved to be "useful for the purposes of testing certain types of theoretical arguments"(Levy, 2008, p.12). These two presuppositions effectively underscore the rationale behind the research methodology chosen for this thesis. Specifically, China stands as a quintessential representation of an authoritarian country wielding significant technological prowess, especially in the realm of emerging technologies (Lee, 2018; Wilsdon, 2007). At the same time, the design of the present dissertation is aligned with the plausibility probe (Levy, 2008)

Moreover, China's surge in global technological diffusion over the past decade has paralleled the roll-out of expansive tech initiatives, notably the projects like the Made in China 2025 initiative. This has had both domestic implications—with a special emphasis on self-sufficiency and economic transformation—and global ramifications (Wübbeke et al., 2016). Central to these dual facets of China's technological rise, particularly in AI, is the nation's need to mobilize and extract vast resources through various channels. According to the inverse Sinatra inference, if one is unable to probe China's resource mobilization and extraction strategies, given its prime position both politically and technologically, then the same approach would arguably fall short for other similar cases. Take, for instance, Singapore. While it mirrors China in melding authoritarian governance with marked advancements in emerging technologies, its global reach, economic weight, military prowess, and overall global influence are considerably less pronounced than China's (Curato and Fossati, 2020; Tan, 2020). If mobilization and extraction strategies of China are not wielding expected results, then this should be even less the case for Singapore and other authoritarian countries similar to them.

The design of this crucial case study is bifurcated into two distinct but complementary sections. The initial segment delves into the international dimensions of China's AI policy, extending more broadly to encompass its overarching technology policy by focusing on systemic variables namely strategic environment and systemic clarity. Conversely, the subsequent section is primarily concerned with

domestic variables, specifically zooming in on the strategies employed for resource mobilization and extraction.

As mentioned above, the neoclassical state action theory sets itself apart from the Neoclassical Realist theory by detailing how states execute mobilization and extraction, especially what concerns its key variables such as strategic environment and systemic clarity, the present dissertation identifies four categories of the strategic environment that individual states can encounter, which can be positioned on a scale ranging from: permissive, partially permissive, partially restrictive and restrictive as a function of individual states' ability to mobilize and extract resources. In addition to this, systemic clarity is also categorized on a scale of low, medium, and high, corresponding to the level of threats and opportunities that China encountered in the selected timeframe.

In examining China's AI policy, with a particular emphasis on strategies for resource mobilization and extraction, this study employs a wide range of sources to provide a multi-faceted analysis. These encompass primary sources such as official guidelines, development plans, and strategic documents issued by both the CCP and local governments in Shanghai and Shenzhen. Additional sources include archival material, notably speeches by CCP leaders and documents from the Chinese government such as the Ministry of Foreign Affairs, the Ministry of Science and Technology, and the Ministry of Industry and Information Technology. To supplement these, declassified intelligence analyses from the Central Intelligence Agency (CIA), archived materials from the White House, and international databases such as the World Bank and the United Nations' Comtrade Database are also integrated to the empirical part of the thesis. Further, the study incorporates data from specialized databases like the Australian Strategic Policy Institute's Chinese Big Tech Companies Database and relevant indices, including the United Nations' Frontier Technology Readiness Index and Stanford University's Human-Centered Artificial Intelligence Institute's AI Index.

In addition to primary sources, the present thesis also avails itself of an extensive array of secondary sources to enrich its analysis. These include reports and translations from prominent think tanks and academic institutions[5].Scholarly contributions are incorporated in the form of peer-reviewed journal articles and academic books. Furthermore, memoirs from officials in both China and the United States serve to provide additional context and perspective.

[5] These include translations and reports from Georgetown University's Center for Security and Emerging Technologies and the Mercator Institute for China Studies.

1.5 Structure of thesis

In alignment with the research question posited, Chapter 2 undertakes a thorough review of existing literature in the field of AI, thereby identifying notable gaps within academic literature. It is important to underscore, as delineated in Chapter 2, that the scope of literature engaged by this thesis is selective. Specifically, it eschews the inclusion of technical studies in AI. Instead, the focus is strategically placed on the examination of AI within the contexts of international relations, the nexus between democracy and authoritarianism, as well as the global and domestic security implications of AI technology. Chapter 2 culminates in the observation that scrutinizing the impact of AI on the three distinct areas—international affairs, the democracy-authoritarian nexus, and global and domestic security—is a complex undertaking. Nevertheless, certain discernible effects are highlighted, including the transformation of threat landscapes at both national and international levels, the augmented use of surveillance systems by authoritarian regimes, and the potential for AI to shift the global balance of power, especially in light of China's ascendance as a technological superpower. This difficulty in establishing a comprehensive understanding primarily arises from the dynamic and rapidly evolving nature of the AI field, where new approaches, regulations, policy papers, and strategic frameworks are introduced on a daily basis.

Chapter 3 lays out the theoretical framework of the thesis, as previously indicated. By synthesizing neoclassical realism and state action theory, this research aims to examine two systemic variables—China's strategic environment and systemic clarity in both historical and contemporary contexts—as well as one domestic variable: techno-nationalism. The latter is identified as a critical factor shaping China's strategies for resource mobilization and extraction in the AI policy context.

Chapter 4 delves into the complex understanding of resource mobilization and extraction, offering clarity on three contentious concepts: resource, mobilization, and extraction. Recognizing the potential for debate and critique around these terms, the chapter delineates their specific limits and implications within the context of AI policy. Additionally, Chapter 4 traces the historical trajectory of AI's development, elucidating why it has attracted academic works and how it influences various facets of global politics. Notably, this chapter identifies data, algorithm, and computing power as the three pivotal components that characterize AI as a resource.

Chapter 5 dissects two independent systemic variables within the context of China's science and technology development. As it stated above, it is important to reiterate that while the primary timeframe of this thesis spans 2012-2023, it's crucial to integrate historical context, especially that of modern Chinese history from 1949 to 2023, to ascertain key events that significantly influenced China's science

and technology trajectory such as for instance, the reform and opening-up period that commenced in 1978 or the following the Sino-Soviet split would be insufficient. Consequently, this chapter initiates its systemic variable analysis from the inception of the People's Republic of China to provide a more holistic view of the interconnectedness of these variables and their impact on China's science and technology development.

In the first part, titled ‘Systemic Stimuli,’ this chapter investigates China's strategic environment in alignment with the premises of the theoretical framework. In other words, how changing the strategic environment particularly within the context of the US-China relationship, impacted Chinese science and technology development. This chapter approached the strategic environments that China has encountered throughout the selected timeframe (1949 to 2023) into four categories: permissive, restrictive, partially permissive, and partially restrictive. This approach provides a nuanced understanding of the various strategic conditions China has faced. In the final section of the chapter, a timeline is provided to highlight key turning points in China's strategic environment. These include significant events such as U.S. President Richard Nixon's visit to China in 1972, the commencement of China's 'Opening Up and Reform' period in 1978, and China's accession to the World Trade Organization in 2001.

The second part of this chapter delves into another systemic variable, that is, systemic clarity. The analysis regarding systemic clarity rests on three assumptions. Firstly, it considers the opportunities and threats the country faces. Secondly, it evaluates if the system provides clear indications about the timeline of these opportunities and threats. Finally, it assesses whether optimal policy alternatives are available or not. Furthermore, this chapter asserts that threats and opportunities, with varying degrees of impact, have consistently existed in the realm of Chinese science and technology development. It also suggests that in most periods investigated in this chapter, the system provided unambiguous signals to the CCP, thereby shaping its foreign policy and economy. For example, between 1949 and 1972, the CCP leadership was cognizant of the fact that as long as China positioned itself as the epitome of the communist bloc, it would predominantly face threats from Western countries. Indeed, when analyzing the CCP's perception of threats, it is imperative to consider the tensions of the Cold War era as well. Opportunities for the CCP weren't always directly tied to China's foreign relations; indeed, there were domestic developments that advantaged the CCP leadership and solidified its power. As in the section on strategic environment, this chapter categorizes three premises across specified periods—periods generally recognized as significant for Chinese science and technology development. This

analysis evaluates categories by ranking the severity of threats and opportunities as high, medium, or low.

In the domestic level side of Chapter 5, the thesis delves into the domestic and external elements of China's AI policy. As it stated previously, while various domestic intervening variables—such as strategic culture, ideology, and leadership perceptions—could influence the CCP's broader technology approach, this study narrows its focus to techno-nationalism. This choice stems from the premise that techno-nationalism stands out as the most salient domestic factor, especially when viewed through a historical lens.

Importantly, techno-nationalism does not operate in a vacuum but intersects with systemic factors such as the strategic environment and systemic clarity. For instance, post-President Xi Jinping's ascent to power in 2012, there was a discernible increase in Chinese techno-nationalism though nationalism has always been a part of CCP's political agenda. This rise bolstered the CCP's efforts to shield its domestic market while achieving a degree of self-sufficiency in emerging technologies, aligning seamlessly with China's broader AI strategy. The latter part of this section delves into the domestic mobilization of resources. As previously delineated, 'resources' within this framework encompass both tangible and intangible assets—ranging from epistemic communities and data to talent and computing infrastructure—all pivotal in augmenting China's AI development. While neoclassical state action theory suggests that authoritarian regimes, China in the present thesis, exert direct control over resource mobilization (direct mobilization)—overseeing every facet of the process—in the context of China's AI policy, the CCP adopts a more nuanced approach. Instead of an all-encompassing central directive, the CCP delegates some authority to local governmental bodies, allowing them to craft and implement their own AI strategies, provided they align with the overarching guidelines set by the central authority. However, this delegation should not be misconstrued as indirect mobilization. Given that local governments act as extensions of the central authority, their actions remain within the ambit of direct mobilization. Essentially, this dynamic showcases the CCP's willingness to integrate flexibility into its governance model, permitting local actors a degree of autonomy to achieve the objectives delineated in official directives. The third section of chapter focuses on the domestic extraction of resources.

As previously highlighted, states extract various resources, often in the form of taxes, to maintain social stability and execute policy decisions. Yet, in the context of AI, this thesis narrows its focus to data as a key resource for AI advancement. This chapter posits that despite the CCP's ratification of numerous regulations and laws aimed at safeguarding personal data, these protections become secondary when juxtaposed with the Party's vanguard role and national security concerns. While legislation geared

towards data privacy promises to protect individual information, laws and regulations centered on espionage and national security empower both the CCP and major tech corporations to amass vast quantities of data, rendering the privacy laws effectively moot. This dynamic is particularly evident in regions like Xinjiang, where the CCP extract detailed personal data—ranging from ethnic backgrounds and daily routines to health records and location traces—under the veil of national security. As the CCP designates this region as a testing ground for emerging technologies, it also disseminates the extracted data to corporations, albeit within a framework of established data-sharing protocols. Nonetheless, the opacity of these transactions makes it challenging to discern the extent of data-sharing between the state and corporate entities.

In chapter five's final section, the emphasis shifts to the CCP's strategies of external validation and extraction. Within the context of external validation, the chapter argues that China has been instrumental in formulating and executing technology policies that both amplify its technological footprint on the global stage and position China as a credible alternative to Western technologies (particularly in emerging technologies). This pursuit of global technology superpower, viewed through the lens of technological supremacy, finds significant expression in initiatives like the Digital Silk Road, especially within burgeoning economies of regions such as Africa that is addressed in the present chapter through the concept 'two market two resources' plan. Simultaneously, over the past decade, the CCP has notably intensified its involvement in technological standards formulation. This trend reflects the CCP's enduring ambition to be recognized as an unparalleled leader in technology. Such prominence is increasingly evident given China's expanding technological influence in developing countries. As Chinese tech firms proffer cost-effective alternatives to their Western counterparts, they concurrently amass considerable influence in shaping tech standards, particularly in regions where Western tech entities maintain a limited presence, thus granting them a de facto standard-setting power. Additionally, the CCP has been strategically positioning itself in key roles within international standard-setting organizations, thereby enhancing its influence on the global stage.

In the section on external extraction, this thesis posits that by broadening their digital footprint, Chinese enterprises progressively gain control over vast datasets, especially in countries where domestic regulations lack the robustness to curtail data transfers. Typically, this entails channeling data back to China to refine and advance technological innovations. Notably, many of these operations transpire through clandestine channels. Additionally, the CCP's strategy for external extraction encompasses tools like Foreign Direct Investment (FDI), Mergers and Acquisitions (M&A), Venture Capital Investments (VCI), and Joint Ventures (JV). Such transactional engagements empower the CCP to compel companies

into sharing their technological expertise, especially within JVs. Through this knowledge transfer, Chinese tech enterprises have enhanced their AI-driven systems, positioning themselves as formidable contenders on the global stage. Finally, over the past decade, the CCP has significantly ramped up its talent acquisition programs, targeting both international experts and overseas Chinese. This thesis categorizes these programs within the overarching external extraction strategy that the CCP has meticulously implemented in recent years.

Chapter 2: State of art of AI in International Relations: A blind spot

In line with the main research question, this chapter explores the state of AI in political science and international relations. Nevertheless, it's important to clarify that this chapter does not explore the technical intricacies of AI, including the fields of science, technology, engineering, and mathematics (STEM), nor does it encompass every facet of political science and international relations. The criteria for inclusion are shaped by the primary research question and the framework of neoclassical realist state action theory.

As such, areas such as distinct governance approaches at both national and international levels, historical aspects of AI, specific national AI strategies and policies, joint initiatives between state and business, as well as the philosophical, ethical, and sociological ramifications of AI have been excluded from the state of the art. Furthermore, four major streams of AI literature have been selected. These are titled as: AI and International Relations, Democracy and Authoritarian AI, AI Race, and (Inter)national Security Implications of AI.

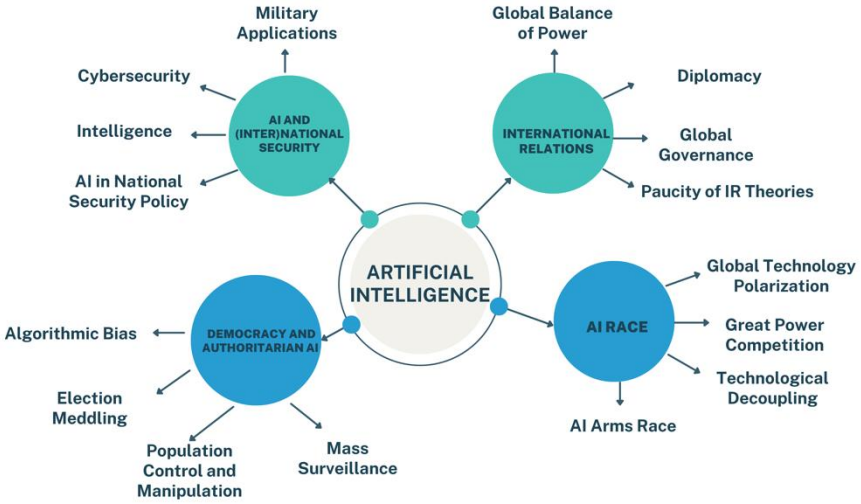


Figure.2 Streams of literature review (Source: Author's compilation)

2.1 AI and International Relations

Within the field of International Relations, there's a growing body of literature examining the influence of AI on global politics. Cummings et al., (2018) delineate three specific roles AI could assume in this domain. Firstly, there's the analytical role, where AI aids decision-makers by revealing distinct patterns and structures in political developments. Secondly, its predictive role can enhance strategic decision-making by offering foresights on certain issues. Lastly, and arguably most significantly, is the operational role where AI intersects with the physical world, as seen in developments like autonomous weapons.

In their assessment, Allison and Schmidt (2020, para.2) posit that advancements in AI ought to be regarded as a "matter of grave national concern," emphasizing its potential to confer significant economic and military benefits to both states and non-state entities. Echoing this sentiment, Kissinger et al. (2021) present a comprehensive exploration in their influential work, focusing on various AI subfields like Natural Language Processing (NLP). They contend that AI represents the most enigmatic technological innovation ever crafted by humankind, urging that its risks and opportunities be weighed equivalently before plunging into its development.

Mirroring this perspective, Walt (2021) advocates for stringent regulations on AI to mitigate its prospective malevolent applications. Additionally, Walt (2021) insightfully argues that despite significant investments in emerging technologies, major tech corporations will not overshadow states in the realm of global politics. This is primarily because these corporations lack the physical capabilities and prerogatives inherent to nation-states. As Walt posits, states remain the paramount entities in steering matters at the intersection of technology and geopolitics.

Indeed, when observing the trajectory of AI's evolution, states have consistently held the reins. If there had been a desire to halt or impede AI's advance, states could have feasibly done so by curtailing funding or introducing stringent regulations. However, the stakes associated with AI are considerable, given its potential to redefine the global balance of power, especially among major players (Fricke, 2020; Horowitz, 2018; Steff & Abbasi, 2020).

Horowitz compares AI's potential to the GPTs by emphasizing "AI seems much more akin to the internal combustion engine or electricity than a weapon. It is an enabler, a general-purpose technology with a multitude of applications. That makes AI different from, and broader than, a missile, a submarine, or a tank" (2018, para.6). Undoubtedly, the multifaceted nature of AI, with its broad applications, introduces a layered complexity. Take, for instance, the interplay of offensive and defensive balance in state-level cybersecurity. In operational terms, AI presents advantages in efficiency, scalability, and adaptability in the cyber realm over human interventions. However, this does not negate its inherent susceptibilities, making it prone to targeted breaches via various means (Bonfanti, 2022; Li, 2018; Lohn, 2020; Musser & Garriot, 2021). Given the prevalent nature of state-sanctioned cyberattacks—actions which rarely escalate into overt confrontations—the intersection of AI with the domain of cyberspace assumes paramount significance (Healey & Jervis, 2020).

That said, there exists a voluminous and ever-expanding literature that delves into the potential ramifications of AI on diplomatic interplay. For example, Feijóo et al., (2020) posit that the chasm between the technologically privileged and the underprivileged can be bridged via the formation of new transnational regulatory entities in the domain of AI. They further hint at the efficacy of 'technology diplomacy' as a salve for the challenges inherent to AI governance. A plethora of scholars (Bjola, 2020; Pauschunder, 2019; Roumate, 2021) have cast their analytical nets wider, probing diverse facets of AI-enhanced diplomacy, ranging from economic reverberations to its transformative potential in reshaping global dynamics.

Kļaviņš (2021) zeroes in on the interplay of global rivalry, specifically underscoring the pivotal role AI plays within the realm of digital diplomacy. In a similar vein, Oriesek (2022) delves into the prospective ramifications of AI in the sphere of preventive diplomacy, a critical tool for state actors as they navigate the delicate balance of looming threats. In an EU-centric analysis, Franke (2021) champions the cause of AI governance, articulating its potential as a formidable asset in the EU's diplomatic toolkit. She meticulously delineates the EU's capacity within the AI realm, laying particular emphasis on the strategic recalibrations the Union must undertake. This is especially pertinent given the profound implications of AI on geopolitical power dynamics, not least due to its transformative military applications. Franke underscores that the EU" needs to consider the external dimension of its action, and how to deal with allies, partners, countries it wants to support, and opponents".

From a theoretical standpoint, attempting to situate AI within a cogent framework presents a formidable challenge. Historically, technology has been treated as an exogenous variable, a mere backdrop, rather than a potent force capable of fundamentally disrupting the international order (Can and Kaplan, 2020; Fritsch, 2011; Mayer et al., 2014). Fritsch (2011, p.28) reproachfully highlights the glaring lacuna in academic theorization, noting that "the theoretical neglect by mainstream IR and IPE is all the more astonishing because the fundamental relationship between technology and IR seems so obvious". Such a situation is somewhat understandable given the vast spectrum of theoretical perspectives within the IR discipline, compounded by the elusive and multifaceted nature of technology when one attempts to theorize and generalize it.

Two primary challenges emerge in this context. First, specific technologies like quantum computing possess distinct characteristics and advantages that may not be translatable to other technological domains. Second, the influence of any given technology on global politics can differ based on numerous factors including funding, prevalence, developmental costs, governance structures, and the surrounding technological ecosystem, among others. Given this complexity, for now, it might be more prudent — or at least less risky — for scholars to apply existing mainstream international relations theories to detailed case studies rather than embarking on the creation of entirely new frameworks. This methodological leaning is evident in the current trajectory of AI research; many scholars in international relations and political science are increasingly focusing on understanding AI's development and implications within the broader topic of global AI governance (Bourne, 2019).

Predominantly, these research lean towards liberal institutionalist paradigms, aiming to craft universal frameworks for global AI governance. Yet, certain nations, notably China and Russia, often appear side-

lined from these debates, a consequence, in part, of the currently polarized global political atmosphere (Butcher and Beridze, 2019; Dafoe, 2018; Gasser and Almeida, 2017; Radu, 2021; Jelinek et al., 2021). Cihon et al., (2020), for instance, shed light on the evident schisms that exist not only between the Eastern and Western blocs but also within supranational entities. A pressing question that emerges is: which guiding principles should nations adopt to regulate AI development? Should they commit to the Organisation for Economic Co-operation and Development (OECD) principles? Or possibly the G20's proposed framework? This is further complicated by the plethora of governance rules and guidelines proposed by both private and public sectors, which only adds to the prevailing ambiguity (Nesta, 2022).

Cihon et al., (2020) present a thought-provoking assertion, suggesting that overly centralizing AI governance may impede its progression, owing to the diverse domestic viewpoints on AI's trajectory, influenced by distinct political agendas and overarching supranational objectives. Echoing a similar sentiment, Schmitt (2022) posits that while the realm of AI governance has seen increasing fragmentation in recent years, a significant majority of nations appear inclined towards the OECD framework. This preference can be attributed to OECD's formidable capacity to shape norms and its recognized epistemic authority. On a divergent note, Fischer and Wenger (2021) advocate for a cross-disciplinary approach, proposing that scholars of international relations should incorporate concepts and methodologies from Science and Technology Studies (STS). This fusion, they argue, would enable a more nuanced understanding of intricate dynamics, operational processes, prevailing practices, and the influence of non-conventional stakeholders in the realm of AI governance.

Indeed, Dwivedi et al., (2021) emphasize the potential benefits of such interdisciplinary thinking for scholars eager to decode the complexities of AI politics. Nonetheless, the certain extent to which the principles and methodologies of STS can be integrated into the study of AI politics remains ambiguous. However, the evident parallels and shared perspectives between the two fields could pave the way for fruitful interdisciplinary endeavors.

Beyond these discourses, efforts have been made to hone the broad concept of governance by concentrating on specific nation-states (Cath et al., 2018; Larsson, 2021; Monasterio Astobiza et al., 2022; Thierer, 2021; Zhang and Dafoe, 2020). Cheng and Zheng (2022) have zeroed in on China's role within the global AI governance framework, while Dixon (2022) offers a comparative analysis of the governance styles adopted by the three prominent players: the US, China, and the EU. In a parallel vein, Roberts et al. (2021) examine the congruencies and divergences between China and the EU, positioning ethics as the fulcrum of their exploration.

It's imperative to acknowledge that while there is an abundance of research focused on AI governance, the field is still in its nascent stages. This is attributable to the ever-evolving nature of AI as a technology. Consequently, guiding frameworks that currently act as regulatory boundaries remain susceptible to significant modifications, reflective of the dynamic trajectory of AI advancements.

Apart from AI governance there are specific concepts that scholars might easily adapt to current global politics. Take for instance, power. Since AI has dual use capability meaning that it can be used both for commercial and military purposes it has potential to disrupt power relations not only among societies and individuals but also among states (Boyd and Holton, 2018; Kiggins, 2018; Maas, 2022). Several scholars, while not centrally engaging with the power concept, have illuminated the widening chasm between the AI 'haves' and 'have-nots.' They argue for the imperative need of developed nations to foster inclusive opportunities, such as collaborative R&D initiatives or financial aid, to bridge this disparity (Alonso et al., 2020; Gran et al., 2021; Kitsara, 2022; Lutz, 2019). Scholars posit that AI, as a nascent technological domain, exhibits particular susceptibilities that echo historical colonial paradigms (Adams, 2021; Mohamed et al., 2020). As a result, there is an imperative to decolonize AI, extending beyond inter-state dynamics to permeate the everyday experiences of the general populace. This perspective holds particular relevance, warranting extensive investigation, especially considering the overarching influence of major tech companies within democratic nations and their prevailing roles in interstate relations (Fukuyama et al.,2021; Zuboff, 2015).

On the flip side of the coin developing/underdeveloped countries are also vulnerable to the developed countries digital expansion that can be seen in the Chinese Digital Silk Road Project (DSR) (Hillman, 2021). It's reasonable to argue that without a supranational governance authority capable of bridging the divide between developed and less developed countries, AI could exacerbate disparities between states, societies, and individuals. The diffusion of these technologies also carries implications of power, subtly indicating the uncertain future that lies ahead if the dissemination of AI tools is regulated by states or international entities (Goldman and Eliason, 2003; Horowitz, 2010; Schmid, 2018). For instance, there are unanswered questions about the degree to which non-state entities or rogue nations might leverage AI tools, not only for deterrence but also for political aims, particularly in gray zone conflicts. However, Horowitz (2020) contends that the adoption of AI will necessitate significant organizational shifts within military structures, implying that the rapid spread of AI tools, especially among non-state actors, may not be imminent. This perspective does not diminish the potential influence of AI across various sectors. Instead, it emphasizes the requisite complex infrastructure for AI development and usage. By extension, entities possessing the means to cultivate a contemporary AI

ecosystem also have the capability to exert societal control via surveillance systems, prompting concerns about the potential drawbacks of such technologies

2.2 Democracy and 'authoritarian AI'

One of the most burgeoning literatures regarding politics of AI is the relationship between AI and democracy (Feldstein, 2019; Hagerty and Rubinov, 2019; Qiang, 2019). In other words, AI usage in authoritarian practices. It's imperative to recognize that the concept of surveillance, as a means of societal control, is not a recent phenomenon. Its historical lineage can be traced from ancient civilizations right through to contemporary era (Marklund and Skouvig, 2021).

Consider, for example, Jeremy Bentham's concept of the *panopticon*, devised as a unique prison architecture to enable constant surveillance of inmates, or George Orwell's seminal dystopian work, *1984*, which poignantly underscores the pervasive nature of authority (Bentham, 2011; Huber, 2015). Despite the technological advances of modern era, the fundamental human inclination towards surveillance, control, and intervention remains a consistent endeavor throughout history. Gandy (1989) depicts this continuum as a surveillance society while others associate surveillance with culture, place and different domestic political variables (Ericson and Haggerty, 2006; Monahan; 2006; Wood, 2009).

Indeed, multiple scholarly perspectives exist to analyze the foundational motivations of states—or humanity at large—in their persistent quest for surveillance, control, and intervention , and generally these ambitions manifest as the quintessence of what has been termed the *Mumfordian Megamachine* that is "an all-encompassing yet invisible unified whole, which not only contains technical and scientific artifacts, but also organizational and bureaucratic hierarchy" (Can and Vieira, 2022, Fristch, 2011, p.31).

Nevertheless, the pivotal question that merits attention is what has evolved over time if the foundational motivations for surveillance and control have remained relatively constant? The unequivocal answer is the advancement of technology and its amplified capabilities. Contemporary societies are now subject to meticulous observation through AI-enabled surveillance technologies. The differentiating factor that determines the ethical deployment of these tools—ensuring they do not infringe upon individual rights—lies in the presence of robust regulatory mechanisms that can preempt misuse. For instance, the European Union's AI Act establishes normative guidelines by employing a risk-based approach and

expressly prohibits arbitrary surveillance techniques that pose an unacceptable risk, such as real-time, remote biometric identification systems. Concurrently, the recent collaborative efforts in AI governance between the United States and the European Union are anticipated to galvanize democratic nations under a broadly 'Western' regulatory framework, despite existing disparities in their respective approaches (Engler, 2022; Kop, 2021; Schiff, 2020).

However, it is significant to acknowledge that these examples do not encapsulate the *gestalt*; rather, they are indicative of a larger trend where authoritarian regimes are intensifying their incorporation of AI across various sectors. Singapore serves as a case in point, exemplifying a 'programmed society' where AI substantially influences realms such as education, immigration policy, the real estate market, and public security (Helbing et al., 2018). Although the ubiquitous deployment of AI can be rationalized by its unparalleled capacity for pattern recognition and data processing, the ramifications it may have on democratic principles remain ambiguous. Nemitz (2018) argues that emerging technologies like AI have engendered new nexuses of power concentration, either in the hands of states or private corporations, reminiscent of the early era of the internet where governance mechanisms were largely absent. Consequently, Nemitz (2018) contends that it is imperative to cultivate a democratic ethos that can adaptively incorporate AI development and usage, with the objective of mitigating potential erosions of democratic systems.

In their seminal paper, Manheim and Kaplan (2019, p.111) hold a similar view that AI might endanger "democratic principles of privacy, autonomy, equality, the political process, and the rule of law". Admittedly, the array of risks is diverse, encompassing everything from online manipulation via deep fakes to the emergence of "black box" AI systems that lack transparency in their developmental processes (Kaplan, 2020). Consider, for instance, the notorious Cambridge Analytica scandal, which garnered widespread condemnation for its suspected influence on the 2016 U.S. presidential election. Utilizing psychographic algorithms, the company accessed the data of 87 million Facebook users to target electoral campaigns, although such targeted efforts were not a novel phenomenon (Heawood, 2018; Hinds et al., 2020; Hu, 2020).

In his seminal book, titled *The Black Box Society: The Secret Algorithms that Control Money and Information,* Pasquale (2015) foresaw and cautioned against the potential for AI-based technologies to become potent instruments for both corporate entities and governments. Pasquale (2015) highlights that:

"But while powerful businesses, financial institutions, and government agencies hide their actions behind nondisclosure agreements, "proprietary methods," and gag rules, our own lives are increasingly open books. Everything we do online is recorded; the only questions left are to whom the data will be available, and for how long. Anonymizing software may shield us for a little while, but who knows whether trying to hide isn't itself the ultimate red flag for watchful authorities? Surveillance cameras, data brokers, sensor networks, and "supercookies" record how fast we drive, what pills we take, what books we read, what websites we visit. The law, so aggressively protective of secrecy in the world of commerce, is increasingly silent when it comes to the privacy of persons".

Crawford (2021) adopts a more comprehensive perspective, contending that the entire lifecycle of AI development—from crowdsourcing and data collection to the extraction of rare earth materials—exacts a substantial toll not only on societal structures but also on the natural environment.

Reflecting on incidents from the past decade, it becomes evident that the unintentional misuse of AI-based technologies is not an isolated phenomenon in the United States. From reinforcing racial prejudices to perpetuating gender biases, the examples are myriad. Take, for instance, the Allegheny Family Screening Tool (AFST), a child abuse prediction system operational in the U.S. If you belong to a low-income demographic, this system could categorize you as a potential child abuser, primarily because AFST's algorithm disproportionately emphasizes criminal records (Eubanks, 2018; Gupta and Krishnan, 2020; Heilweil, 2020; Lee et al., 2019).

While evoking the atmosphere of a science fiction narrative, algorithmic bias is an all too real facet of contemporary human existence. It's worth highlighting that, following President Biden's election, his administration has made concerted efforts to address and rectify potential vulnerabilities within AI-driven technologies. Since 2019, a slew of legislative proposals, such as the Algorithmic Accountability Act, Justice in Policing Act, and the Facial Recognition and Biometric Technology Moratorium Act, have been introduced to the US Congress. For some analysts, these legislative efforts reflect a shift in US AI policy, aligning more closely with European Union standards (Engler, 2022; Feeney and Chiu, 2021). More seriously still, many leading tech corporations in the US have exhibited reluctance to collaborate on projects with state entities, especially those with military dimensions, fearing potential public backlash (Crofts and van Rijswijk, 2020; Malmio, 2023). Despite the latent risks AI-driven technologies might pose to democratic institutions, regulatory measures initiated by democratic nations are likely to curb arbitrary and unchecked applications of these tools.

Nonetheless, the genuine perils of AI-driven technologies appear to be conveniently integrated into the operational frameworks of autocratic regimes, where mass manipulation, intervention, and control are increasingly prevalent. China stands out as the most intricate and significant exemplar of this trend. It is significant to recognize that, following the Communist revolution (1949), both the handling of societal challenges and the architecture of state security were conceptualized as a cybernetic system. This feedback-oriented structure granted policymakers the latitude to devise and execute strategies without necessitating a meticulously detailed blueprint (Hoffman, 2017; Wiener, 1988).

In exploring the nexus between authoritarianism and artificial intelligence in China, Zeng (2020) scrutinizes how AI amplifies the CCP's authoritarian policies and interrogates why China has evolved into a technologically driven totalitarian state. Zeng identifies three core reasons: first, there is an absence of a higher authority capable of intervening, regulating, or mitigating the potential harmful consequences of AI usage other than the CCP itself. Second, societal resistance against the government's contentious technological policies is comparatively muted. Lastly, the deployment of technology for population control is deeply ingrained in Chinese cultural ethos. Indeed, social engineering has been an enduring feature of Chinese governance, tracing back from the Ming Dynasty to the present-day CCP. This preoccupation has taken various forms, such as the grid-based *Baojia* (保甲) system—originally instituted by the Song Dynasty—which facilitated population control through community-based informants, thereby ensuring imperial security (Fu, 1993; Miracola, 2019; Tian, 2016).

Yet, modern China has transcended the need for human 'sharp eyes' to convey constant information to the authorities. Instead, it adeptly deploys AI-driven mechanisms for societal control, intervention, and surveillance (Andersen, 2020; Roth and Wang, 2019). Qiang (2019) contends that China's efforts in employing surveillance technologies have not only intensified but have also become more comprehensive, encompassing activities like the collection of DNA samples in minority-dominated regions, the employment of voice recognition systems, and the pilot testing of initiatives like the social credit system

The Xinjiang region, predominantly inhabited by the ethnic Turkic Uyghur minority, stands as a stark representation of a contemporary *Orwellian* society. In this region, facets ranging from personal life to professional hours are meticulously monitored through a combination of intrusive applications, surveillance apparatus, and other AI-powered mechanisms (Leibold, 2020; Millward and Peterson,

2020). Roche and Leibold (2022) suggest that the construction of such a technologically advanced ‘open prison’ is rooted in the phenomenon of ‘state racism’. Meanwhile, Kam and Clarke (2021) evaluate the nexus between these practices and China's determination to securitize emerging technologies.

In alignment with these perspectives, Zeng (2021) investigates official discourses of CCP stalwarts and discerns an overarching securitization of AI technologies, driven primarily by deep-seated national security apprehensions. Of paramount concern is the alleged engagement of major Chinese tech corporations in using ethnic minorities as test subjects—essentially ‘guinea pigs’—to refine AI tools through learning from their errors (Chin and Lin, 2022; Harris, 2019; Holdstock, 2022). According to Hoffman (2022), China exemplifies the epitome of a tech-fortified authoritarian state, underscoring the urgency for global democracies to articulate to their society the potential threat China's model poses to democratic principles.

One of the most alarming trends in recent years is the proliferation of these technologies to third-party nations. Countries such as Singapore, Malaysia, Egypt, Ecuador, among others, have integrated Chinese surveillance tools into their security systems (Chestnut Greitens, 2020; Russon Gilman and Benaim, 2018). Given the precarious state of global democracies, currently grappling with waves of populism, it seems almost inevitable that these AI-powered tools will further empower autocratic governments to suppress, control, and manipulate their populations. While these technologies provide unprecedented leverage to authoritarian rulers, Crosston (2020) posits that the widespread adoption of these tools could relegate these nations to becoming mere digital colonies of China. Indeed, there is a genuine concern that AI systems could be weaponized to exploit the most vulnerable segments of society, be they economically disadvantaged groups or those facing racial discrimination (Adams, 2021; Mohamed et al., 2020).

Gravett (2021) lends further credence to this argument by examining Chinese technology exports to Zimbabwe. In his analysis, Zimbabwe emerges as a veritable testing ground for China, providing an opportunity to refine the capabilities of AI tools through access to vast datasets. If these technological systems of control prove effective, the implications are ominous; there's an increased likelihood that more African nations might adopt similar strategies. This raises a pressing question: What is it that draws developing or "have-not" countries towards Chinese-manufactured technologies? To quote Wang (2021, para.8):

"The emerging Chinese technological ecosystem is both functional and affordable. Huawei's 5G has captured many Western governments' attention, and Beijing's Baidu navigation system now prevails over the U.S. version, GPS, in more than 160 countries. China is pushing governments to adopt its National Transportation Logistics Platform, an international logistics system designed to integrate road, sea, air, freight, and postal information that is controlled by China's Ministry of Transport. Chinese applications are also spreading fast. TikTok has gone global, Alibaba is making inroads in Southeast Asia, and Tencent's WeChat is embedded in the Chinese diaspora's digital life. China's model of Internet "sovereignty," by which the state delimits and controls the Internet within its borders, has inspired governments from Egypt to Thailand"

Corroborating the argument put forth by Can and Kaplan (2020), the United States and Western democracies have conspicuously failed to provide viable technological alternatives to their Chinese counterparts over the past decade. This is despite their considerable advantages in technological infrastructure and innovation. In the absence of more economical and dependable options, it is foreseeable that third countries—predominantly those with illiberal regimes—will persist in their adoption of AI-based technologies originating from China in the years to come. This trend has been further exacerbated by the geopolitical tensions between the United States and China, tensions that notably intensified during the Trump administration. In response, democratic nations have endeavored to construct new security architectures, such as the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) and the AUKUS alliance, as well as global governance frameworks like the Global Partnership on Artificial Intelligence (GPAI), with the aim of counterbalancing China's technological proliferation across various global regions (OECD, 2023). These initiatives, in concert with American export control measures on technology, have catalyzed a dual process: a decoupling of technological ecosystems and an accelerated competition in emerging technologies domain (Cerderio et al., 2021; Farrel and Newman, 2020; Garcia-Herrero and Tan, 2020; Wei, 2019).

2.3 AI race: Realities and implications

Throughout history, technology has invariably acted as a catalyst, shaping the trajectory of human civilization. One would be hard-pressed to identify an era where humans did not innovate, strive to surpass their competitors, and in essence, redefine their very existence through the novel tools they fashioned. This observation might evoke the *Hobbesian* portrayal of the state of nature, characterized by a life that is "poor, nasty, brutish, and short". While foundational principles underpinning the modern

international order and state systems might have evolved, from the realist lens of International Relations, the inherent dynamics and power plays remain remarkably consistent (Orbell and Rutherford, 1973, p.25; Vasquez, 1998; Waltz, 2014). As an illustration, although the instruments and mediums through which states and significant global actors seek power have undergone transformations over centuries, the core objectives and the quintessence of power have remained steadfast. Without question, historical conflicts fueled by religious strife, sectarian divides, ethnic tensions, and competition for resources have imparted invaluable lessons to humanity. The foundational principles that inspired the establishment of international organizations and supranational governing bodies continue to hold relevance in contemporary global politics. However, even as these principles endure, one elemental aspect of systemic anarchy—namely, the struggle for power—remains an immutable constant. This occurs despite the ever-shifting driving forces that sculpt the landscape of history.

Brende (2023) argues that the intensifying rivalry among global powers has transitioned into a contest situated within zero-sum zones, notably in economics, technology, pandemic response, and the recent conflict in Ukraine. While history may not necessarily repeat itself—though some argue it does—it does exhibit cycles in which emerging technologies serve as catalysts for great powers to assert their dominance or secure their national interests. Consider, for example, the Cold War era: Actors were polarized ideologically, yet were engaged in relentless pursuits of nuclear capabilities (Hoffman, 2009; Plous, 1993). Not all states that achieved nuclear prowess managed to maintain a competitive edge in other burgeoning technological fields such as aerospace, often due to a combination of domestic and international variables. Nonetheless, this does not diminish the importance of technology itself or the arms races it precipitated.

Emerging technologies have the potential to rapidly alter the balance of power and create seismic shifts in the geopolitics. Simultaneously, they can confer unparalleled economic benefits upon nations that successfully harness them. Yet the effective development of these technologies is contingent upon a myriad of factors, including path dependency, long-wave economic cycles, and technology life cycles (Christensen et al., 2013; Fukuyama, 2017; Herrera, 2012; Kondratieff, 1979; Liebowitz and Margolis, 1995; Taylor and Taylor, 2012).

In this regard, the post-Cold War period is not markedly different from its predecessor in terms of the crucial role technology continues to play. Modern emerging technologies have not only inaugurated a new digital epoch but have also ignited ferocious competition among states (Galiana and Green, 2009; Lerner, 1997).

Artificial intelligence stands as a pivotal component within a broader constellation of emerging technologies, which also includes quantum computing, biotechnology, nanotechnology, extended reality, 3D printing, among others (Savage, 2020). However, there are specific factors that position AI at the crux of this global technological race. Firstly, AI acts as a catalyst for economic growth, offering the potential for substantial leaps in the economic performance of developed countries. It achieves this by automating labor-intensive tasks, excelling in pattern recognition far beyond human capabilities, and optimizing decision-making processes in specialized contexts (West and Allen, 2018). Secondly, AI plays an indispensable role in national security applications. It is foundational to the development of autonomous weapons systems, law enforcement technologies, reconnaissance and intelligence gathering, surveillance infrastructure, and sophisticated analytics for military logistics (Gorman, 2022). Hence, it is reasonable to conclude that the ongoing race for AI supremacy serves as a tangible reflection of its intrinsic significance. Leung holds the similar view "The intensifying race between the US and China to lead at the frontier of AI may be the defining great power competition of our time" (2019, p.3).

A burgeoning body of academic literature has begun to interrogate the escalating competition in artificial intelligence, particularly noticeable since the latter half of the 2010s. Haner and Garcia (2019), for instance, explore the AI arms race in the realm of autonomous weaponry, advocating for preventive measures to mitigate the intensification of such competition. In contrast, Geist (2016) contends that while it may be too late to halt the race entirely, there remains scope for implementing regulatory measures akin to 'Track II' diplomacy. Asaro (2019) adopts a more holistic approach by scrutinizing the social science frameworks that underlie the AI arms race. Similarly, Armstrong et al. (2016) develop a model to illustrate the dynamics of an AI race. They find that increasing transparency in AI development can actually exacerbate a security dilemma among competing states.

Taddeo and Floridi (2018) caution that unrestrained advancements in AI, absent of a global regulatory framework, could fundamentally alter the operational paradigms for both state and non-state actors in cyberspace. Such a shift, they argue, could escalate low-level confrontations into broader conflicts.

Maas (2019) posits that lessons can be learned from international arms control regimes, which have been successful in constraining the proliferation of nuclear weaponry. However, he acknowledges the distinct dynamics and attributes of AI and nuclear technologies, suggesting that a direct transplant of such policies might not be entirely feasible. Furthemore, Maas (2019) suggests a three-pronged analytical framework to comprehensively understand the dynamics and challenges of the AI race in relation to global regulations. First, he underscores the necessity for robust norm-institutionalization to

decelerate the widespread diffusion of AI-based technologies. Second, he emphasizes the crucial role that epistemic communities could undertake in crafting effective global regulatory mechanisms. Finally, he critiques existing propositions aimed at curbing potential harmful applications of AI, asserting that they fall short in adequately mitigating its potential malevolent impacts.

Scharre (2019) holds the view that the true peril emanating from AI technologies is not necessarily from states' ambition to ascend as global AI front-runners. Instead, the dominant narratives over recent years, which accentuate AI's quintessential role, are perilous, triggering unforeseen risks and potentially reckless competition. Aligning with this perspective, Roff (2019) argues that how we contextualize and interpret the AI competition among nations substantially influences tangible outcomes. Specifically, framing the AI race as a zero-sum contest "Misrepresents the competition going on among countries. To address the risks of AI, the policy community needs a clear-eyed appraisal of its capabilities and limitations. Without that orientation, those who hope to steer AI research and development in positive directions will create more problems than they solve" (Roff, 2019, p.1). Indeed, while the hype and inflated expectations surrounding AI's future potential may not fully align with current realities (Hao, 2022; Horgan, 2020; Mathew et al., 2021), this divergence should not undercut the pressing geopolitical implications that AI development has already unleashed, particularly in the form of intensified competition among major powers such as the United States and China. Consequently, scholarship focused on the AI 'race' remains an indispensable component for understanding both the historical trajectory and future prospects of AI development, as well as its broader implications for global politics.

2.4 AI and (inter)national security

Few domains within international relations are as perennially debated and inherently contentious as the concept of security when it comes to the formulation of a cogent analytical framework. This observation finds resonance in the research of Dunn Cavelty and Mauer (2010, p.1), who note "the landscape around us would still be constantly changing while we were completing the picture". When we introduce the convoluted dimension of technology into the equation, our comprehension of the technology-security nexus, or more precisely, our foundational understanding of security, undergoes a profound transformation. Galeotti (2022) articulates this evolving security landscape as the 'weaponization of everything', suggesting that while the core tenets of conflict, war, or security remain consistent, the mechanisms and modalities of their operation are in a state of perpetual evolution.

This argument becomes acutely salient within the context of the AI ecosystem and its attendant emerging threats. Brundage et al. (2018) undertake research into the multifaceted perils engendered by AI technologies, categorizing these threats into three primary dimensions: physical security, digital security, and political security. This tripartite taxonomy (in the context of AI) potentially broadens our conventional frameworks for understanding the concept of security, as delineated by Buzan et al. (2013).

Hunter et al. (2018), adopting a more encompassing purview, investigate the national security implications intrinsic to the AI ecosystem. They argue that the advent of novel threats rendered by AI technologies necessitates their immediate incorporation into the United States' national security strategy formulations, thereby requiring legislative attention from the U.S. Congress. Corroborating this perspective, Babuta et al. (2020) assert that AI holds the potential to significantly enhance state capacities in national security across three key sectors: organizational process automation—including the utilization of AI tools in human resources management—cybersecurity, and augmented intelligence analysis. The Intelligence Community (IC) may emerge as the principal beneficiary of AI applications, given its imperative need to process voluminous and multifaceted data streams. This contention is amplified by Zegart (2022), who notes that the IC faces escalating challenges in assimilating and analyzing the deluge of daily data generation. The phenomenon of internet literacy, Zegart adds, increasingly transmutes lay individuals into de facto open-source intelligence (OSINT) analysts, particularly due to the widespread availability of 'sensitive information,' such as commercial satellite imagery (O'Connor, 2022). Consequently, Zegart (2022) underscores the invaluable role AI could play in expediting the data-processing pipeline, attributing to it superior capabilities for pattern recognition among disparate data sets.

In the same vein, Regens (2019, p.1) puts it "Adapting AI to the intelligence enterprise and national security decisions more broadly thus facilitates rapidly bringing to bear the essential human element of interpreting context and intent amid an otherwise insurmountable cascade of data". Lim's (2015) perspective on the integration of Big Data analytics within the IC distinguishes itself from the prevailing scholarly literature by placing an emphasis on long-term developmental trajectories. Specifically, Lim (2015) advocates for the formulation of mechanisms that enable the application of Big Data analytics in the construction of competitive hypotheses and the substantiation of intelligence assessments.

Barnea (2019) identifies two primary factors that contribute to the IC's difficulties in effectively adapting to the digital age. First, the inertia within the IC can be traced back to its entrenched organizational culture, which leans conservative and might be resistant to swift technological adaptation. Secondly, IC

does not have enough “Acquaintance with capabilities being developed by the business world” (Barnea, 2019, p.433). Indeed, when contrasting the vast availability of data with the speed of its collection and analysis, there is a discernible misalignment between these two paradigms. Such incongruence arguably necessitates the Intelligence Community to prioritize measures to address this gap in data governance (Palfy, 2015). By the same token, Brantly (2018) contends that AI has the potential to surmount the challenges the Intelligence Community currently faces in interpreting data amassed from a multitude of devices. However, Eldridge et al., (2018) express reservations about the reliability of AI, especially with regard to algorithms. They suggest that an over-reliance on AI could potentially mislead analysts in specific scenarios where human discernment, capable of comprehending the multifaceted nature of certain issues, is indispensable. Consequently, the inclusion of human involvement in the intelligence cycle should be viewed as *sine qua non*, rather than fully relegating responsibilities to AI-driven systems.

Beyond these seminal contributions, there is a burgeoning body of research delineating the role of Artificial Intelligence (AI) within the discipline of security studies. For example, Payne (2018a; 2018b) interrogates the extent to which AI engenders a transformative impact on strategic affairs, analogously to how the concept of the Revolution in Military Affairs (RMA) reconfigured strategic thinking in prior decades. Meanwhile, other scholars probe specific concepts in the sub-domains of security studies, such as the offense-defense balance, nuclear strategy, and strategic stability (Altman and Sauer, 2017; Fitzpatrick, 2019; Garfinkel and Dafoe, 2019).

In a related thread, an expansive array of research scrutinizes the implications of AI-enabled Autonomous Weapons Systems (AWSs) for the future of warfare (Cummings, 2017; Scharre, 2018; Johnson, 2019). For instance, Gartzke (2019) undertakes an inquiry into how remotely piloted weapons systems may revolutionize conflict dynamics. He posits that ensuing conflicts may incur fewer costs and achieve more decisive outcomes, although unintentional casualties may proliferate. This assertion is contested by Calcara et al., (2022), who argue that such weapon systems have yet to revolutionize modern warfare. In a parallel vein, Shaw (2017) examines the nexus between robotics and warfare, specifically through the lens of the US hegemony. Further, Roff and Danks (2018) critique the AWSs' deficiencies in predictive capabilities within the complicated atmosphere of a modern battlefield, while Roff (2014) explores how existing military doctrines' targeting protocols complicate AWSs' compliance with noncombatant immunity principles.

Importantly, the complex nature of decision-making and target identification impose additional challenges on military personnel who are increasingly reliant on AI-enabled systems. Suchman (2020)

warns that AI-based military engagements could precipitate elevated conflict levels and non-discriminatory targeting, particularly if human oversight is minimized. More gravely, Johnson (2020) contends that supplanting human faculties—such as empathy, critical reasoning, and intuition—with AI could engender destabilizing outcomes, should policymakers underestimate or misconstrue the technology's role in decision-making processes. In their article on the involvement of autonomous weapons in modern warfare, Goldfarb and Lindsay (2022) surmise a particularly disquieting scenario. They maintain that while the acquisition of high-quality data is crucial for the successful implementation of AI-based military systems, they also caution that "AI-enabled warfare will tend to become more protracted and confusing" (2022, p.12).

In the literature regarding the armed conflict, the question of responsibility for the unintended casualties of noncombatants remains both complex and contested. Schulzke (2013) argues that the responsibility should be apportioned between the military hierarchy and the developers of autonomous weapons. Contrarily, Jain (2016) contends that the complex environments in which AWSs operate make the attribution of responsibility challenging. This is largely due to the diverse roles individuals play within combat scenarios, suggesting that responsibility must be discerned on a context-specific basis. Beard (2013), however, introduces another dimension, emphasizing the state's obligations under the Law of Armed Conflict and International Humanitarian Law. In his view, responsibility should not merely be disseminated among individuals or entities; states themselves should be held accountable, particularly for the actions of personnel authorized to operate remotely controlled vehicles.

With the backdrop of this debate is the understanding that AI systems, as they currently stand, lack moral agency and artificial consciousness — a reality that is unlikely to change in the foreseeable future, based on projections from Warren and Hillas (2017). The advent of AI transcends mere enhancements in physical operational environments. It fundamentally reshapes established domains, notably cybersecurity. This confluence between AI and cybersecurity presents a dual-faceted viewpoint. While AI can augment defenses against cyber threats, for instance in malware detection and intrusion alerts, the AI-cybersecurity interface is equally susceptible to cyber vulnerabilities. These vulnerabilities can potentially be exploited by adversaries, compromising decision-making, sampling, and learning processes (Buchanan et al., 2020; Li, 2018; Zhang et al., 2022).

In their study, Yampolskiy and Spellchecker (2016) arrive at the conclusion that the rise of artificial intelligence is poised to intensify the challenges faced in the realm of cybersecurity. Nevertheless, they maintain that solutions for these security gaps will be available to parties with comparable technological capabilities. Offering a less optimistic perspective, Wilner (2018) suggests that the future interplay

between AI and cybersecurity has the potential to significantly amplify automated disinformation efforts in cyberspace. In contrast, Bonfanti et al. (2021, p. 222) suggest that definitive statements about the future relationship between AI and cybersecurity are premature at this point since "we are far from observing any sustained academic research on AI in cyber-security in the non-technical disciplines". Indeed, the merging of AI and cybersecurity is an emergent field that leaves many questions unanswered regarding the potential applications and misapplications of these technologies. However, Csernatoni and Mavrona (2022) hold the view that global entities, including the European Union, are already in the process of establishing regulatory frameworks aimed at preempting future misuse. Financial projections also support the significance of this growing area, with estimates indicating that the market for AI applications in cybersecurity will reach a net worth of $34.8 billion by 2025. Despite the opportunities, the intersection of AI and cybersecurity remains complex, posing both risks and advantages for stakeholders (Taddeo et al., 2019).

The research showcased thus far underscores the burgeoning interest in AI among scholars of political science and international relations. Analogously, should AI development fulfill widely anticipated milestones, like AGI or superintelligence in the near future, it would not be overstatement to suggest that the very landscape of global politics will undergo profound transformation. Such a shift might redefine our understanding of readily available concepts, from military power, economic dynamics, and balance of power to threat landscapes, terrorism, and espionage activities, among others. Furthermore, if AI technologies were to advance beyond current boundaries—particularly if computing capabilities achieve the 'Q-day' threshold where quantum computers can decrypt current encryption standards—the trajectory of AI applications could see an unprecedented surge. This would equip them with advanced solutions, drawing the attention of scholars racing to develop comprehensive theoretical structures capable of capturing the intricate nuances of human cognition (Herman and Friedson, 2018).

In assessing the current academic literature, discernible gaps in the scholarly works become evident. Primarily, a limited number of studies have adopted theoretical frameworks when examining AI. This deficiency is attributed, in part, to challenges arising from the scarcity of mainstream theories available for such analyses (Lee, 2018; Ndzendze and Marwala, 2023; Polcumpally, 2022; Sharifzadeh et al., 2022). Even when an appropriate theoretical perspective is identified, applying designated framework becomes problematic. The dynamic nature of AI's development, compounded by the frequent introduction of strategic AI initiatives, collaborative projects, regulations, and policies by nations, international entities, and private sectors, only amplifies the complexity of developing AI-focused theories. This situation has often led researchers to adopt concepts and theories from disciplines with a

longer history of technology analysis, such as Science, Technology, and Society (STS) studies, or sociology. In response to this observed gap, this thesis proposes to adopt and evaluate the principles of the neoclassical realist theory of state action. Notably, only a handful of academic studies have rigorously explored the intricate relationship between AI and global politics at the doctoral research level (Ertan, 2022; Gutierrez, 2020; Leung, 2019; Lee, 2020; Scharre, 2020). As such, this thesis aims to enhance the prevailing body of knowledge, juxtaposing theoretical explorations with the implications of AI within the global politics.

Chapter 3: Theoretical framework: Neoclassical state action theory

3.1 The realist paradigm of International Relations: An overview

While it may seem somewhat conventional to assert that the realist framework in international relations offers the most suitable lens for examining global competition and conflicting interests, the argument's validity should not be underestimated. Despite the range of counterpoints and alternative models presented in academic literature (Guzzini, 2013; Legro and Moravcsik, 1999; Milner, 1991; Rosenberg, 1994), realism's enduring relevance emerges not merely from a growing skepticism towards idealistic liberal viewpoints on complex global issues, but also from the evolving nature of international relations. Currently, these relations are increasingly characterized by reduced multilateral cooperation, greater unilateralism, intensified rivalry, zero-sum policy choices, among other trends. These shifts are manifested in recent turbulent events, including but not limited to, the election of former US President Donald Trump, the COVID-19 pandemic, escalating geopolitical tensions between the United States and China, and Russia's recent incursion into Ukraine (Ferguson and Zakaria, 2017; Ikenberry, 2010; Mead, 2021). Moreover, this line of reasoning finds further support in ongoing debates over whether the phenomena of deglobalization and increased regionalism are establishing a new status quo for international actors (King, 2018; Rodrik, 2022; Stiglitz, 2019).

When tracing the origins and evolution of the realist school in international relations, it's crucial to highlight that classical realism was largely a response to the prevailing idealism of the early 20th century. This idealism notably informed the establishment of the League of Nations and subsequently the United Nations (UN). Advocates of idealism asserted that wars were not primarily triggered by inherent human animosities, or grievances, but were a result of the absence of robust political systems and frameworks that could reshape inter-societal relations (Korab-Karpowicz, 2018; Mearsheimer, 2005). To them, there was a pressing need for an overarching institution that would avert wars and orchestrate international relations based on shared values, international legal norms, and common interests (Ninkovich, 1999; Owen, 1994).

Yet, to vehement detractors like E.H. Carr (2016), such a perspective was viewed as overly simplistic and overly optimistic. He argued that the goals of universal morality and a unity of international interests were, in essence, unattainable aspirations - a viewpoint that he believed was rooted in relative understanding (Korab-Karpowicz). Hence, E.H. Carr advocated for a more pragmatic approach that emphasized observable realities over lofty ideals. When E.H. Carr underlies the main motivation of behind *The Twenty Years' Crisis, 1919-1939,* he argues the book was written "With the deliberate aim of counteracting the glaring and dangerous defect of nearly all thinking, both academic and popular, international politics in English-speaking countries from 1919 to 1939 — the almost total neglect of the factor of power" (1946, p.7).

Hans Morgenthau further expanded the realist focus on power through his seminal work, *Politics Among Nations: The Struggle for Peace and Power.* Morgenthau (1955) argues that the use of universal moral principles as a guide in international relations can be fundamentally misguided. This is because, according to him, the core impulse of human nature is not rooted in morality but in a desire to accumulate power—a sentiment echoing Thomas Hobbes' arguments from centuries prior.

Realist theory evolved yet again with the publication of Kenneth Waltz's groundbreaking work, *Theory of International Politics,* in 1979. This work heralded the birth of a new subfield within realism, commonly known as Neorealism or Structural Realism. Waltz (2010) suggests that for actors within the international system, the pursuit of security—or survival—is paramount and often supersedes other short-term or long-term objectives. This, indeed, leads actors to compete with each other rather than cooperate in the anarchic nature of the international system. Kenneth Waltz opines that "international structure emerges from the interaction of states and then constrains them from taking certain actions while propelling them towards" (1990, p. 29). Furthermore, structural realists maintain that "international politics can be understood only if the effects of structure are added to traditional realism's

unit-level explanations" (Waltz, 1990, p.34). Subsequent to Waltz's contributions, John Mearsheimer (2014) further nuanced the neorealist paradigm by underscoring the interplay between power and security. Within this framework, he distinguished between offensive and defensive realisms. Adherents of offensive realism maintain that, given the anarchy of the international system, states inherently seek to maximize their power as a means to ensure their survival and security. In contrast, defensive realism offers a more cautious perspective on power accumulation, suggesting that aggressive strategies aimed at power maximization can inadvertently lead to avoidable conflicts and may ultimately prove detrimental to a state's interests.

As for each of the major premises of realist international relations theory (Classical realism, Structural realism, Offensive realism and Defensive realism), five distinct points can be made (Baylis et al., 2020; Burchill et al., 2022; Dunne et al., 2021; Johnson and Thayer, 2016; Lobell, 2010).).

Firstly, Classical realism posits that human nature serves as the foundational bedrock for understanding international relations, characterized by elements of skepticism, self-interest, the instinct for survival, and the aspiration for power and control, encapsulated in the Latin term *animus dominandi* (desire for power). In contrast, structural realists focus on the pivotal role of states within the context of an anarchic international system. While they acknowledge states as the central actors shaping global dynamics, they also underscore the significance of supranational organizations in the broader framework of international relations. Secondly, both strands of realism—classical and structural—concur that states operate within a self-help paradigm, a direct consequence of the anarchic nature of the international system. This anarchic structure can either propel actors toward cooperation, motivated by what some term as 'Hobbesian fear', or push them into adversarial engagements, especially when resources, essential for maintaining power whether military or economic, are finite. Thirdly, structural realists contend that within an anarchic system, states instinctively gravitate towards counterbalancing emerging powers. This can be achieved internally, for example, by reallocating resources to enhance the security capabilities of the state, or externally, such as by broadening existing alliance structures. Moreover, leading scholar of structural realism Kenneth Waltz (2010) argues that distribution of power is a major factor in the international system to understand whether actors will confront each other militarily or not.

Fourthly, a key tenet of offensive realism—a subcategory of structural realism as delineated by Mearsheimer (2014)—is that states can best ensure their long-term security and survival by maximizing their offensive power. This contrasts with Waltz's (2010) more cautious view, which suggests that accumulating excessive power could provoke other actors to engage in an arms race. Finally, defensive

realism, another sub-branch of structural realism supported by scholars such as Grieco (1990), Jervis (1978), Snyder (1991), and Van Evera (1999), argues that security is not a scarce resource. Consequently, states should avoid destabilizing the balance of power by seeking excessive power, as this could result in counterproductive scenarios where security dilemmas intensify and the balance of power shifts. Instead, defensive realists advocate for the pursuit of moderate power levels sufficient to ensure a state's survival.

3.2 Neoclassical realist theory: Main assumptions and types

In line with the anarchic nature of the international system, neoclassical realist theory argues that states, like their realist forebears, operate according to their distribution of power, making this distribution a defining factor in state behavior. This aligns them with Kenneth Waltz's viewpoint that the structural nature of the system should be the starting point for any analysis (Rathbun, 2008). However, what sets neoclassical realists apart from other schools of thought within realism is their additional focus on domestic variables along with systemic ones. For instance, Ripsman et al. (2016, p. 19) critique the narrow scope of neorealism by emphasizing:

"Domestic politics and leader characteristics play no significant role in determining policy, given the great dangers of acting inconsistently with systemic imperatives in an anarchic realm. Consequently, if faced with similar external threats and opportunities, states with different regime types, ideologies, and political institutions can be expected to behave in similar manner".

Thus, Neoclassical Realist Theory seeks to explain various dynamics underpinning states' foreign policy decisions by incorporating different variables such as domestic institutions, public opinion, leadership, and perception rather than merely focusing on systemic stimuli and states potential responses to it. More seriously still, domination of external determinism (systemic stimuli) in neorealism leads scholars to overlook four distinct points that, according to neoclassical theory, restrict neorealist perspective. These are "the ability of leaders to perceive systemic stimuli correctly, the lack of clarity in the international system, the problem of rationality, and difficulty of mobilizing domestic resources" (Ripsman et al., 2016, p. 20; Rose, 1998; Sterling-Folker, 1997).

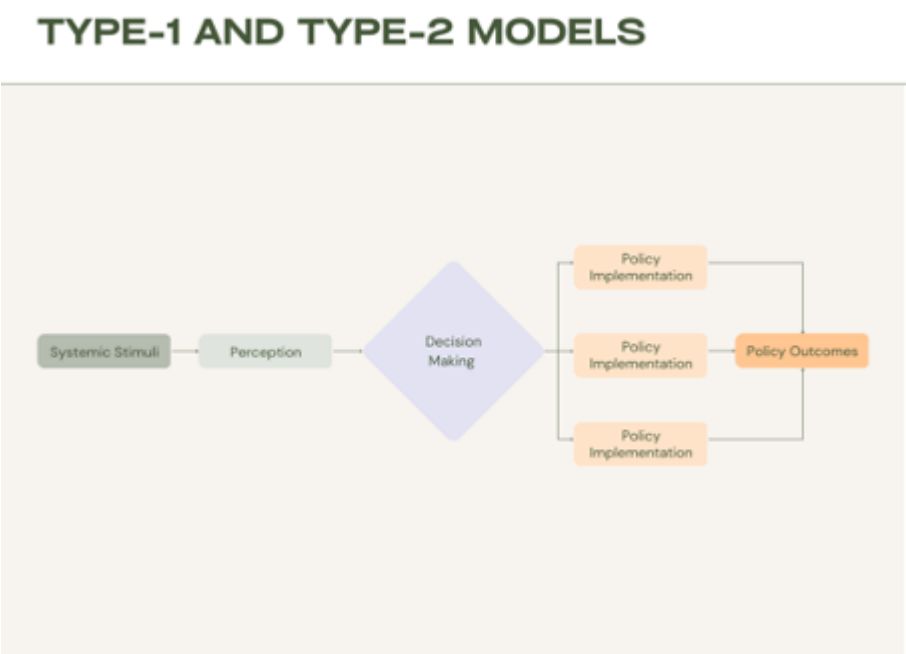


Figure. 3 Type-1 and Type-2 models of neoclassical realism (Source: Ripsman et al., 2016)

Neoclassical realist theory, therefore, uses frameworks to mitigate limits via so-called Type 1 and Type 2 models (Ripsman et al., 2016). Scholars who advocate and use the Type-1 model argue that the international system in general sends explicit signals to the states, yet domestic politics and perception of decision and policy makers occasionally lead to an incomplete picture. Therefore, the Type-1 model seeks to explain processes that end up with inadequate policy responses (or major deviances). Type-2 on the other side of the coin ventures to explain any foreign policy decision (rather than a deviance) regardless of the clarity of the international system's signal (See Table-2). Ripsman et al., (2016), however, proposes Type-3 that encompasses numerous domestic intervening variables such as strategic culture, leader images, state-society relations, state's capacity to implement any policy decision. Moreover, they define structural modifiers including geography, offense and defense balance in military technology and rates of technology diffusion that might impact the balance of the system (i.e. anarchic ordering principle and the relative distribution of capabilities) and actors' behavior in units and subunits. Apart from structure modifiers, Ripsman et al., (2016) emphasizes the significance of polarity in the international system (i.e., whether the international system is unipolar, bipolar or multipolar). However, they assume that polarity of the international system should be treated in behavioral terms rather than a part of dominant patterns of alignment and alliance creation. Key systemic variable for

states is the clarity of signals and information (i.e., threats and opportunities) that the international system sends to the states. As Ripsman et al., (2016, p.46) puts it there are three components of systemic clarity: "1) the degree to which threats and opportunities are readily discernible; (2) whether the system provides information on the time horizons of threats and opportunities; and (3) whether optimal policy options stand out or not".

In addition to systemic clarity neoclassical realists consider the strategic environment of states as a significant variable that impacts their foreign policy decisions. The strategic environment reveals the content of information, while systemic clarity indicates the scope and level of threats and opportunities (Ripsman et al., 2016). In other words (Ripsman et al., 2016, p.52):

"All things being equal, the more imminent the threat or opportunity and the more dangerous the threat (or the more entic- ing the opportunity) the more restrictive the state's strategic environment is. Conversely, the more remote the threat or opportunity and the less intense the threat or opportunity, the more permissive the strategic environment is"

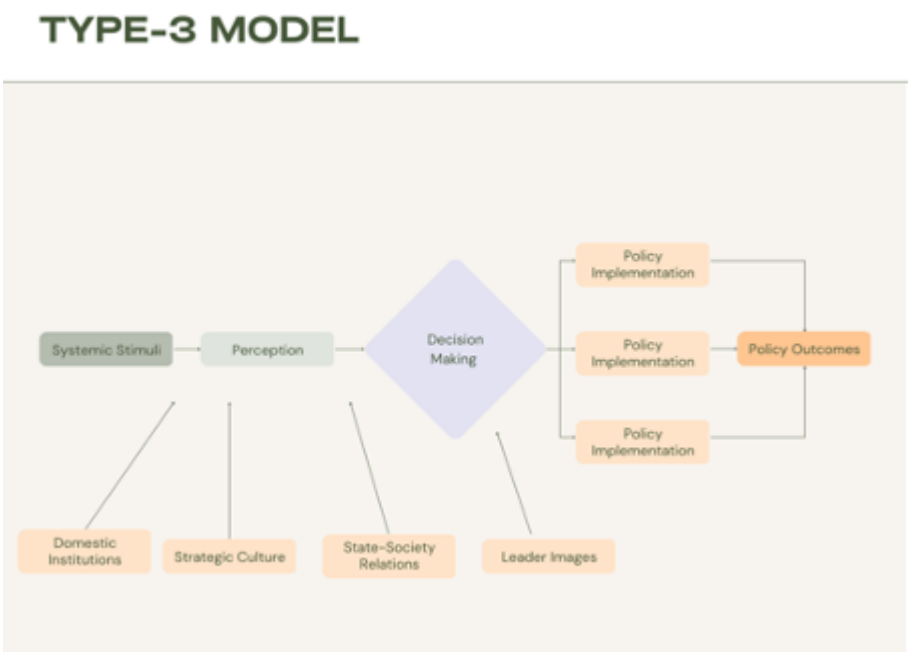


Figure.4 Type-3 model of neoclassical realism (Source:Ripsman et al., 2016)

3.3 Realist theory of state action

In their groundbreaking investigation, Mastanduno et al. (1989) proffer a plausible framework elucidating the complex relationship between domestic and international politics. Indeed, the domains of domestic and international politics are inextricably intertwined and mutually influential, such that a development within one sphere may readily permeate (in terms of ramifications) the other. This ultimately engenders ambiguity concerning states' inter(national) objectives and policies. The theoretical framework proposed by Mastanduno et al. (1989) situates the state at the epicenter of this conundrum, incorporating tenets of both classical realism and neorealism. As a result, states emerge as the preeminent actors delineating the feasible trajectory and outcome of any policy, given their pursuit of goals and policies on both national and international levels. State action theory asserts that states, as distinct entities separate from society, possess autonomous agencies that mold goals and strategies.

To decipher this interwoven relationship, Mastanduno et al. (1989) devise a dual-level analytical approach. Firstly, states execute domestic strategies in pursuit of international goals. Secondly, states implement international strategies to achieve domestic goals.

In their work, Mastanduno et al., (1989) embarked upon an expansive perspective by centering their analysis on the mobilization and extraction of resources by states at varying tiers. The foundational premise of this viewpoint is that national power, which corresponds to “the relative ability of the state to extract and mobilize resources from domestic society as determined by institutions of the state as well as by nationalism and ideology”, delineates the nature of individual states' internal balancing tactics (Taliaferro 2006, p.467). Similarly, Thomas J. Christensen (1996) characterizes national power as the capacity of state leaders to galvanize their nation's human and material resources in support of security policy initiatives.

If realist theory maintains national power as an essential asset for states, in conjunction with the anarchic configuration of the global system and the interplay between competition and cooperation among states, it is reasonable to first examine the principal resources (e.g., raw materials, population, or geographic advantages) that states pursue for material prosperity and influence (Can and Vieira, 2022). Consequently, an inquiry into the methods by which states utilize these resources, such that their policies coalesce seamlessly within both domestic and international realms and the implications thereof reverberate across various echelons (domestic and international), merits further exploration (Can and Vieira, 2022).

Relevant inquiries, which hold significant relevance to the comprehension of the present thesis, have been posed by various scholars and explored through diverse case studies. Case in point, Jeffrey W. Taliaferro (2006) proposes a resource extraction paradigm of the state, which posits that states strive to implement mobilization and extraction strategies as a means of internal balancing by emulating major powers and adopting innovative policies, especially when confronted with external threats (Can and Vieira, 2022). In a similar vein, Christensen (1996) concentrated on the unsuccessful domestic mobilization (two-level mobilization model) strategies of the United States and China as components of their grand strategies to counterbalance the Soviet threat while contending with their mutual animosity during the Cold War epoch. Needless to say, mobilization and extraction strategies constituted a substantial element of the United States' grand strategy throughout the Cold War; these strategies not only potentially hastened industrial advancement, but also converted economic outputs into military prowess. Likewise, Fareed Zakaria (1999) scrutinized factors in the history of the United States between 1865 and 1908 that expedited or impeded the transformation process (mobilization and extraction) of material resources into political interests (Can and Vieira, 2022). Aaron L. Friedberg (2000, p.5) contends that, in the United States, these "power-generating mechanisms," aimed at internal balancing through the procurement and mobilization of domestic resources, "linked the state to society, and permitted it to transform societal resources into military capabilities" (Friedberg, 2000, p.5).

From a theoretical perspective, Mastanduno et al., (1989) postulated that states' primary international objective is to acquire power and wealth, as these are fundamental elements for ensuring their survival in an anarchic system. Within the framework of state action theory, states pursue international goals via domestic strategies, which primarily assume two forms. In one approach, states elect to mobilize resources by intervening in the economy, either directly or indirectly. Direct internal mobilization through nationalization or central planning occurs predominantly in planned economies or ***hard states***, a term that refers to centralized and authoritarian states such as the People's Republic of China (in contrast to decentralized and, consequently, constrained ***soft states***, such as the United States). Direct internal mobilization strategies that are employed by ***hard states*** (in the present thesis that is China) could extensively be effective “when the nation state needs to undertake a big push or Great Leap Forward to catch up with competitors who have industrialized earlier” (1989, p.462)

Alternatively, states (which generally are ***soft states***) may opt to undertake indirect internal mobilization by establishing “efficient property rights, provid[ing] an atmosphere conducive to technological innovation, dismantl[ing] rent-seeking coalitions, or insulat[ing] [themselves] from such coalitions” (1989, p.462). When comparing direct and indirect mobilization strategies, it becomes

apparent that direct mobilization requires significant bureaucratic proficiency—specifically, a high degree of coordination among state institutions—and may prove to be less effective over a prolonged period. In contrast, indirect mobilization has shown to be more effective in the long term, given that the potential costs of implementing the policy are distributed not just among state entities but also involve non-state actors, such as the private sector. Apart from mobilization strategies (direct or indirect), another domestic strategy for international goals involves the extraction of resources from "society for military expenditures, foreign aid, contributions to international organizations, propaganda, and other exercises of power" (1989, p.463). Ultimately, extracting resources through taxation, requisition, and expropriation enables states to transmute wealth into power: "mobilization is the creation of wealth and an investment in power. Internal extraction is the creation of power and the consumption of wealth" (1989, p.463). Distinction between ***hard states*** (China) and ***soft states*** (the United States) when it comes to extraction of resources are evident. For Mastanduno et al., (1989) Because ***hard states*** can exercise direct control over the means of production, they are better at extracting resources, whereas ***soft states*** may be relatively slow at extracting resources because they have readily available checks and balance mechanisms that limit their capacity to extract resources.

As well as employing domestic strategies for international goals, states implement international strategies to accomplish domestic goals. The primary motivation for states at the domestic level is to "overcome challenges from, and maintain the support of, societal groups and coalitions" (1989, p.463). By capitalizing on their international stature and resources, states possess the capacity to fortify their domestic power foundation and assuage internal tensions, thereby guaranteeing their aptitude to administer efficiently and maintain stability. First international strategy for domestic goals that states might pursue is external extraction. External extraction simply refers to a process where states seek to acquire resources from outside, occurring either as a direct (which state transfers resource to itself) and indirect (which state distributes resources to society) way. It is imperative to note that external extraction takes a coercive (explicit or implicit) form in most cases that favors powerful states vis a vis less powerful states in the extraction process. As the demand for resources escalates, states endeavor to undertake external extraction, which succinctly "refers to state efforts to accumulate resources from outside [their] borders that can be of use in achieving domestic objectives" (1989, p.464). In addition to external extraction, states seek to implement external validation strategies to preserve their legitimacy at the domestic echelon, thereby permitting them to "exploit their stature as authoritative international emissaries of the nation-state to augment their domestic positions" (1989, p.464). This (external validation) might occur via creating an image that is a legitimate technology superpower in the present

thesis both for China and the United States though Mastanduno et al., proposes external validation strategies primarily for newly established states by participating international organizations and thereby having more opportunities to extract external resources.

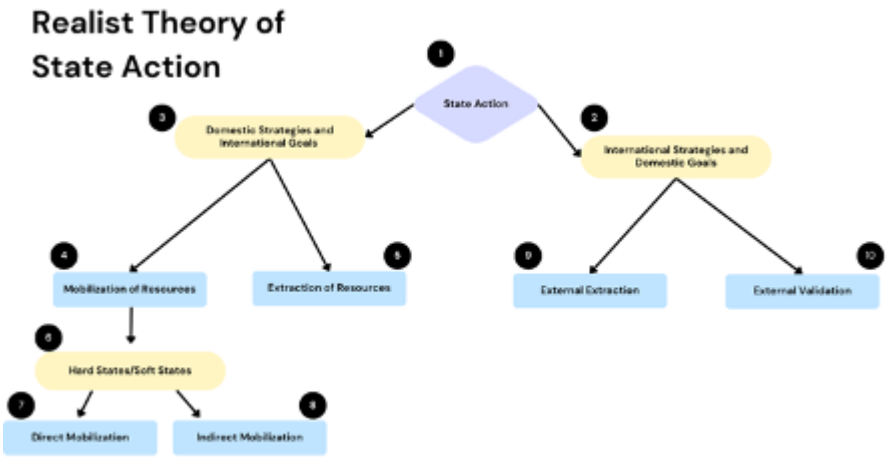


Figure 5. State action theory (Source: Mastanduno et al., 1989)

3.4 Limits of state action theory and main premises of thesis' theoretical framework

As any theoretical framework, state action theory has its advantages and limitations. One reason for this is the theory's occasional neglect and somewhat dated approach to understanding the complex relationship between domestic and international goals and strategies. Moreover, the theory's scope of understanding is limited, even though Mastanduno et al. (1989) do not assert it to be a one-size-fits-all or universally applicable framework. For instance, the theory falls short in explaining how systemic factors like strategic environments or the dynamics of the international system influence states' domestic and international aims and tactics, despite its claim to blend elements of neorealism and classical realism. Similarly, the theory does not convincingly identify which internal variables, such as strategic culture or the effectiveness of state institutions, play a critical role in the mobilization and allocation of resources—even though its classification of states as either 'hard' or 'soft' offers a plausible explanation.

Hence, while this dissertation primarily employs the foundational analytical framework of state action theory, it enhances the theory by incorporating both systemic components, such as strategic environment and systemic clarity, and domestic factors, with techno-nationalism serving as an

intervening variable. Additionally, this thesis categorizes China as a hard state where state authority can directly mobilize and extract resources. The present thesis utilizes a theoretical framework that melds state action theory with neoclassical realist theory, employing strategic environment and clarity of the international system as independent variables, along with techno-nationalism as a domestic intervening variable. These variables are central to understanding how China shapes its AI policies through the mobilization and allocation of resources. It's important to recognize that the chosen variables offer a limited lens through which to examine the full spectrum of policy decisions and their outcomes. Alternative domestic intervening variables, such as strategic culture, could potentially shed light on how actors develop their AI policies. This could be supplemented by various other domestic variables including bureaucratic efficacy, dynamics between the state and the private sector, and overarching strategic goals, among others. However, this dissertation narrows its focus to China's techno-nationalism, which has been a pivotal factor in the formulation of its AI policies, as will be further elaborated in the empirical section of the study.

Within the context of this dissertation, techno-nationalism, posited as a domestic intervening variable, does not intrinsically elucidate the mechanism by which entities marshal and allocate resources. Rather, this research posits techno-nationalism as the foundational linchpin. As such, techno-nationalism assumes a pivotal role in delineating the trajectory of AI policy formulation, accentuating particularly the intrinsic motivations propelling the actor to strategize its AI initiatives. This trajectory, wherein techno-nationalism operates, concurrently interacts with systemic variables, offering a multifaceted perspective on policy determination.

In the realm of international politics, states are the preeminent actors, operating in an anarchic international system largely governed by the distribution of various types of power. These types range from military and economic power to soft, technological, and smart power. Evolving technologies, such as artificial intelligence, have taken on increased significance as essential tools for states to enhance their technological capabilities. States mobilize and extract resources for dual purposes: to compete effectively on the global stage and to capitalize on the myriad opportunities presented by advancements in AI. Focusing on China, the nation strategically utilizes external validation mechanisms to secure its standing as a 'technological superpower.' These mechanisms manifest in various forms, including the initiation and implementation of alliances or projects like the DSR, as well as efforts to coalesce other states around their strategic initiatives. China's strategies for external resource extraction, particularly in the context of AI, vary in nature and are explored in depth in the empirical section of this dissertation.

The dimensions of resource mobilization and extraction, and their respective scopes and rates of implementation, are influenced by two systemic variables: the strategic environment and the clarity of the international system. These systemic variables interact with a domestic intervening variable—techno-nationalism—to shape the dynamics of state action. It is essential to recognize that the methods by which states mobilize and extract resources are further influenced by whether they are categorized as 'hard' states, which are state-centric and unconstrained, or 'soft' states, which are limited by other actors or legal regulations.

It should be noted that this dissertation concentrates on the analysis of China as a prototypical 'hard' state, intentionally avoiding a comparative perspective that might include other nations such as the United States. The aim is to provide an in-depth exploration of a singular actor rather than to engage in comparative analysis.

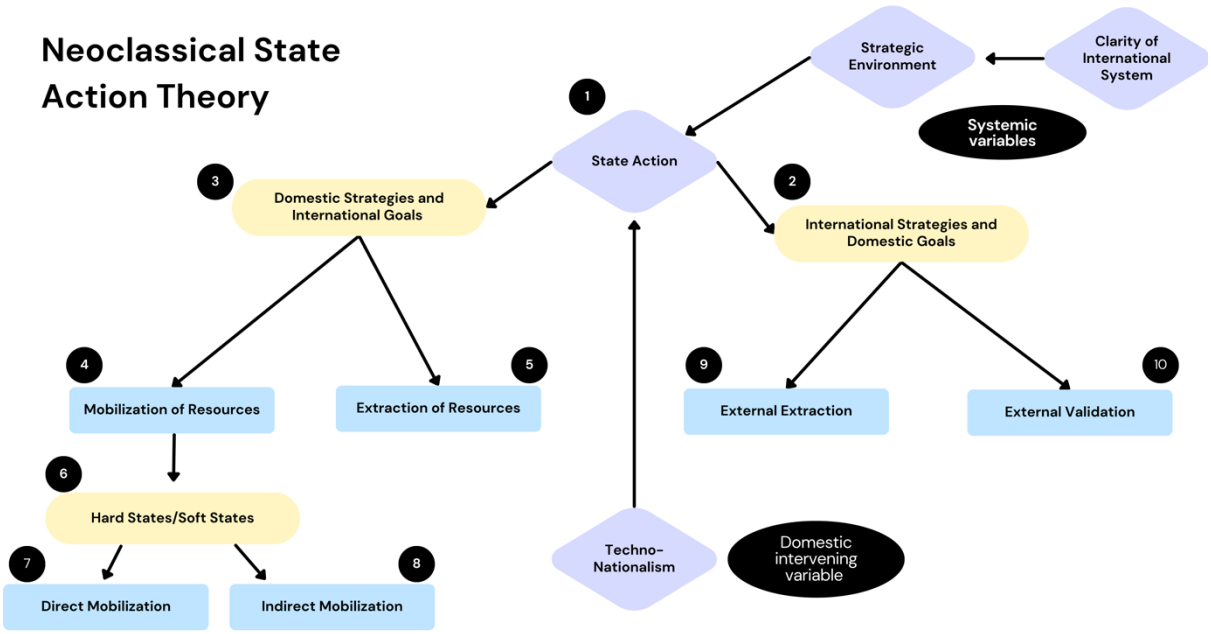


Figure 6. Neoclassical state action theory (Source: Author's compilation)

Chapter 4: How to define resources in an artificial intelligence context?

It is challenging for those seeking to find meaningful frameworks to define resources and demarcate their limits. This thesis, therefore, highlights the necessity to define and determine the limits of what

constitutes a resource in an AI context. Indeed, a multitude of resources are required to create an AI system, starting with the rare earth elements (such as Gallium and Lithium), to crowdsourcing workers (for data labeling), as has been mentioned in the literature review section (Crawford, 2021). In addition to this, to date, the relationship between resources and state has mostly been investigated from various perspectives, including international political economy, development studies, concepts of state capacity and national power. For instance, there are available metrics such as the Composite Index of National Capability (CINC) to measure national capability by focusing on different variables including resources that are at the disposal of states (Chan, 2005; Ransom, 2018). Though this approach has its own merits, it is imperative to acknowledge that there are limits in quantifying state capacity in terms of selected resources. Case in point, among the many resources that can be gauged, such as economic resources, population, and military aircrafts, there are also unmeasurable ones, such as social capital and identity networks, which may influence state policies significantly. Despite this, resource and state relationships have also been viewed from different perspectives. For instance, Hanson and Sigman (2021) holds the view that material and non-material resources (e.g., monetary, human and informational resources) are central elements of state capacity whereas Tellis (2001) embodies three-dimensional measurement of national power that encompasses national resources (technology, enterprise, human resources, financial resources and physical resources), national performance and military capability. Similarly, Treverton and Jones (2005) classify resources as an enabler of national power. In contrast to most scholars, they examine not only domestic national resources, but also international resources that states may be able to extract. In a seminal paper Beckley (2018) divides resources into two distinct categories namely gross resources and net resources (when additional costs are added to calculation such as security cost, production costs and welfare costs).

Before delving into the definition of the concept 'resource' in the context of artificial intelligence, it is significant to note that the mobilization and extraction of resources has increasingly garnered the attention of scholars in recent years, particularly within the tripartite nexus encompassing the United States, China, and emerging technologies.

Consider for instance the following quotes; while Beckley and Brands (2021, para. 21) discuss the technology policy of China they point out “The main reason is that China’s top-down R & D system, **although excellent at mobilizing resources**, stifles the open flow of information and capital necessary for sustained innovation”. Similarly, Popper et al., (2020, p.33) examines China's innovation policy and underlies the direct mobilization ability of the Chinese government as “National authorities

can **allocate resources directly** but can also exert strong indirect demand- pull influence over the directions of innovation through procurement decisions and the issuance of tenders". Moreover, Blanchette (2021, para.12) discusses the effectiveness of a ***hard state*** in a Chinese context, suggesting that: "Perhaps the most effective tool Beijing has in its management of the country is its ability to achieve rapid results via targeted political, ideological, and regulatory campaigns. By ruling by authoritarian fiat, the party can **mobilize and channel resources** with remarkable speed". In the same vein, Tagaki (2022, para.7) underscores in regard to the implementation of AI in the Chinese People's Liberation Army (PLA) that "The strategy and tactics of the people's war, which Xi referenced, mean fighting not only with the military but with the total power of the nation. This implies that informatization and intelligentization will not be achieved solely by the military but will **mobilize all of China's assets** and scientific and technological development".

On the United States and western democracies side of the technology policy Hillman (2021, para.20) underlies the importance of offsetting Huawei's global 5G projects with alternatives by asserting "During its first-ever meeting in September, the U.S.-EU Trade and Technology Council created a working group that will help finance digital connectivity in developing countries. Ultimately, these efforts will succeed or fail based on their ability to set standards and **mobilize resources** toward actual projects". In a broader perspective the United Nations held a conference regarding science, technology and innovation in 2021. The main puzzle of the meeting was the question of" How **can we mobilize science, technology, and innovation** to improve the lives of those furthest behind and reduce inequalities, without perpetuating the digital divide, especially during rapid technological change?" (The UN, para.8).

The term extraction has also been the focus of an extensive array of studies to date. For instance, Ganguly and Thompson (2017) investigate India's state capacity and the ways in which India extract resources. By considering material resources as a variable, the authors examine both India's extraction of these resources and its legitimacy as an attitude resource that can be used for or against states. Similarly, Wang (2001) explores the connection between the CCP's resource extraction capabilities and the notion of state-building from 1949 to 1953. According to Wang (2001), the CCP significantly outperformed imperial rule in terms of resource extraction, which can be attributed to the party's organizational strength and ideological commitment. Although these studies enhance our understanding of the extraction process, their methodologies, theories, scopes, and limitations diverge considerably from those of the current thesis. Filary-Szczepanik (2022) perhaps presents the most analogous approach in terms of theory to this thesis, as it explores four distinct types of states (imperialist, status

quo, young, and narcissist), their national power resources (primarily extraction capabilities), and how these states shape their foreign policies based on their capabilities at their disposal.

In view of the aforementioned quotations and studies, it becomes essential to pose the following questions: How should we interpret the mobilization and extraction of resources within the technological domain, with particular emphasis on artificial intelligence? Furthermore, which resources are at the disposal of states in the context of this rapidly evolving field (i.e., AI)?

First and foremost, the present dissertation addresses both tangible and intangible assets as resources, regardless of encompassing financial endowments or epistemic communities, provided that the manifestation of these entities can be morphed into a form of wealth for states both in the long and short term. Secondly, it is essential to acknowledge that not all resources are amenable to mobilization or extraction. This distinction implies that, due to its inherent characteristics, one resource may be subject to extraction, while another may exclusively be mobilized. This is particularly significant for the present dissertation's theoretical framework. Finally, it is likely that a wider array of resources could be accessible to states for the implementation of their AI policies. However, this dissertation confines its focus and scope to a distinct set of resources, which will be elaborated upon in subsequent discussions.

It is necessary to access three key elements in order to develop cutting-edge artificial intelligence systems. These are algorithms, data and computing power that might be called the 'AI triad' (Buchanan, 2020; Lohn and Musser, 2022; Xu et al., 2021). These components of AI can be viewed as resources that can be mobilized and extracted. For instance, while artificial intelligence is capable of creating algorithms, states or private actors still depend on talented STEM graduates to create advanced algorithms in order to mitigate different flaws (i.e. algorithmic bias). Therefore, human capital becomes an important resource in this context and actors (i.e., state institutions or private companies) that might employ these talents become a resource as well subject to the mobilization (Can and Kaplan, 2020; Han and Appelbaum, 2018; Zweetslot et al., 2019). Apart from algorithms and its reliance on STEM talent, another key resource is data for AI development although debates regarding the extent of datasets are still underway (Burgess, 2022; Frey and Osborne, 2020; Michel, 2023). In simple terms, without enough and quality datasets AI systems (machine learning systems) can not be trained for the desired outcome which ultimately brings the problem of data extraction to the forefront for states and private actors. This implies, as discussed in the literature review (AI governance and regulations), that the way in which states and non-state actors extract data is largely a matter of the political system (i.e., hard and soft state) of states, in which laws restrict states' ability to extract data, despite the fact that it is still debatable whether having a democratic system will ensure prevention of data breaches or

misconduct due to democracies' vulnerabilities in data protection (Hartzog and Richards, 2020; Rosenbach and Mansted, 2018). The importance of data as a resource is argued (in the context of ***soft states***) by Stanford University scholar Amy Zegart (2022, para.9) as "Increasingly, emerging technologies and data are major sources of national power, and they are intangible, harder to see and understand, and often created and controlled by companies, not governments". Therefore, this thesis will examine data as a key resource in AI context that states can extract (regardless of the involvement of private actors).

Final key component of AI is the computing power which refers to a hardware that allows AI to be trained with a large swath of data. In this dissertation semiconductors (microchips) will be added to analysis of the present thesis' framework. There are indeed other significant elements of computing power such as quantum computing though the future of common usage of them is still unpredictable as discussed above, yet the focus of dissertation will be limited to 'geopolitics of semiconductors' (in the context of AI policy) and how China mobilizes resources in this context. Apart from these three essential resources, states might mobilize and extract different resources. For instance, the facilitation of technology transfer within the artificial intelligence context could significantly bolster a country's capability to amplify its AI policy. Similarly, states may establish initiatives or programs aimed at attracting top-tier global expertise, ultimately facilitating the extraction of global talents beyond their territorial boundaries.

The present thesis defines the concept of mobilization as a tool to accumulate resources (whether tangible or intangible) directing to a selected policy outcome. In addition to resource accumulation, the concept of mobilization also includes the process of rallying various actors, such as state institutions and private enterprises, in support of a targeted policy agenda. This involves the establishment of new projects, state-backed initiatives, joint task forces, and other similar endeavors, as the actors engaged in these efforts are regarded as potential resources for the intended policy. Furthermore, this research conceives that extraction is a thorough process involving sundry actors, including individuals, private corporations, and other relevant actors. Extraction denotes the transfer of resources, whether tangible or intangible, from these actors to the state, which may subsequently play a pivotal role in shaping and implementing desired policies by converting the acquired resources into wealth.

4.1 Decoding AI stack

The relationship between machines and humans has consistently captivated the intellectual curiosity of thinkers, scholars, philosophers, and scientists throughout the course of human history, replete with startling examples spanning from the dawn of ancient civilizations to the present day. Nilsson (2009) aptly opines that the initial impetus for this fascination originated from dreaming and dreamers. In essence, the discovery of scientific or philosophical pathways to understand readily observable phenomena or concepts in nature has consistently been driven by the same line of thinking. Perhaps a simple question—what if? —serves as the impetus for such exploration. The advent of artificial intelligence can be traced back to such questioning. In Homer's Iliad, penned circa the 8th century BC, a machine-like automata in the form of a tripod, crafted by Hephaestus, is depicted as serving the gods (Nillson, 2009; Papalexandreu and Papalexandreu, 2005). Same goes for the different political thinkers, authors and philosophers who were occupied with the idea of thinking machines. For instance, in his writing, Aristotle refers to an automatic puppet who has "the ability to move 'by itself' i.e., to continue moving in the absence of an agent in contact with it, and moreover to respond to inputs in ways that are determined by the construction of the device" (Berryman, 2003, p.358). Furthermore, one of the greatest thinkers of political theory, Thomas Hobbes, describes Leviathan as a type of automata indicating his profound engagement with the interaction between human and machine, despite appearing only once in the seminal book *Leviathan* (Bhorat, 2019).

Advancing to the 19th century, we observe one of the first attempts to outline the role of artificial intelligence (inspired by Charles Darwin's work *On the Origin of Species*) in Samuel Butler's satirical portrayal of a utopian society during the Victorian era, entitled *Erewhon*, examines human relations within a machine-dominated society. The twentieth century diverged significantly from the previous century, primarily due to the transformative effects of industrialization on communication, automation, transportation, and production. Despite the upheaval caused by two catastrophic world wars, which profoundly disrupted not only global politics but also the fundamental nature of society, this period witnessed the emergence of innovative theories and applications regarding AI. These new ideas were grounded in centuries-old theories, assumptions, and thought experiments and led to real AI applications as well as theoretical advancements. A notable example is Alan Turing's applied examination, the Turing Test, which is a language-based experiment designed to determine whether humans can distinguish between a machine and a human interlocutor during a conversation while they are in separate rooms (Oppy and Dowe, 2021). This groundbreaking experiment marked a pivotal

moment in the field of artificial intelligence. Its prominence stemmed not only from its central focus on the question, 'Can machines think?', but also from its role in catalyzing further research and theoretical inquiry across diverse disciplines, including cognitive psychology, engineering, and philosophy. The Turing Test thereby inspired and motivated other scientists to delve deeper into the multifaceted aspects of AI and explore the potential for machine intelligence. One of the significant examples was psychologist Frank Rosenblatt's seminal work in 1958 called 'Perceptron' that examined the first neural networks, setting off debates during that period regarding structure, dynamics and principles of mind (brain) (Rosenblatt, 1961). However, it is essential to note that AI as a concept was coined in the famous the Defence Advanced Research Projects Agency (DARPA) sponsored Dartmouth summer conference in 1956 by leading scholars in that field such as John McCarthy and Marvin Minsky (Bringsjord and Govindarajulu, 2018; Moor, 2006). In subsequent years, the Dartmouth Conference galvanized scholarly enthusiasm for the prospects of artificial intelligence, fostering a widespread conviction that AI could indeed become a reality. This era has been commonly referred to as the 'AI Spring', defined by an unprecedented level of financial investment in R&D from both private actors and state institutions. The increased funding and widespread optimism during this period laid the groundwork for notable advancements in the field of AI (Buchanan, 2005). Yet hopes regarding the future of AI waned during the 1970s due predominantly to technical barriers that eventually led to 'AI winter' both in terms of funds and the amount of research (Hendler, 2008). A key reason for the decline of funds and interest in AI was James Lighthill's AI report, which was prepared for the United Kingdom government (Agar, 2020). In his report, Lighthill (1973) criticized developments in AI for not delivering the promises the AI field had made, which led the United Kingdom government to direct resources to other promising fields. Indeed, way before the Lighthill's report Minsky and Papert's book (which critiqued the efficacy of neural networks) *Perceptron* published in 1969 "led many (including, specifically, many sponsors of AI research and development) to conclude that neural networks didn't have sufficient information-processing power to model human cognition" (Bringsjord and Govindarajulu, 2018, para.91).

With the global advancements in AI field both in terms of application and theory attracted scientists and private actors again to invest in AI circa the beginning of 1980s. However, starting from the late 1980s to 1993, the AI field experienced another (AI Winter) downfall (Shin, 2019). At this point, it is essential to ask why AI experienced ups and downs. Whereas the major reasons remain open for debate and various factors could be echoed, it can be argued that symbolic AI or Good Old-Fashioned AI (also known as expert systems), was not sufficient for fully realizing AI, both from a theoretical and real

applications perspective. Symbolic AI refers to a method in which human experts determine a set of rules that represent their knowledge. These rules are then programmed into machines, allowing them to perform tasks based on the established guidelines (Russell and Norvig, 2010). Mitchell (2019, p.37) points out that "A symbolic AI program's knowledge consists of words or phrases (the "symbols"), typically understandable to a human, along with rules by which the program can combine and process these symbols in order to perform its assigned task."

The 2000s witnessed a significant transformation in the field of artificial intelligence, in stark contrast to the fluctuating levels of optimism and pessimism experienced in previous decades. This period marked a departure from the iterative patterns of hope and disappointment that had previously shaped the AI landscape. Increasing availability of data (thanks to common usage of the internet and the advent of Big Data), advancements in computing power including affordable costs of hardware, breakthroughs in Graphics Processing Units (GPUs) and new approaches in a subfield of AI via machine learning algorithms based on the deep neural networks expanded the reach, capability and scope of AI at an unprecedented level (Barrat, 2013; Boden, 2016; Russell, 2019). From the beginning of 2000s machine learning replaced the symbolic approaches by a substantial margin. In simple terms, machine learning (non-symbolic) refers to an approach that seeks to employ algorithms to learn from the selected datasets based on neural networks (Alpaydin, 2021). It is important to note that machine learning is a subfield of AI and while the present thesis uses the concept of AI, it refers to a machine learning system rather than symbolic AI (expert systems). With that being said, deep learning refers to a machine learning method that relies on three or more layered neural networks. Neural networks are artificial/simulated systems (containing artificial nodes and neurons) that mimic the ways in which the human brain works.

Concurrent with advancements in computing, data, and algorithms, other breakthroughs in AI have enabled the field to broaden its impact and reach a wider audience. For example, the research on deep learning conducted by prominent British scholar Geoffrey Hinton substantially altered the trajectory of AI in the 2000s (Fradkov, 2020). In 2012, a study titled *Imagenet Classification with Deep Convolutional Neural Networks*, authored by Geoffrey Hinton, Alex Krizhevsky, and Ilya Sutskever, considerably influenced the AI field, specifically in the area of computer vision, despite not being the first of its kind (Krizhevsky et al., 2017). In 2016, DeepMind's AI system, AlphaGo, played the ancient Chinese game of Go with a human champion, called Lee Sedol. The AI system demonstrated its superior performance by securing a 4-1 victory, which sparked further discussions regarding the future of artificial intelligence in both academic and broader realms (Silver et al., 2017). The triumph of an AI system defeating a

human in the complex game of Go, which offers a mind-boggling 250^{150} possible moves for a player throughout the match, was indeed a noteworthy defining moment though AlpaGo was designed to conduct only one task (i.e., Narrow AI). This accomplishment underscored the rapidly advancing capabilities of artificial intelligence in handling complex tasks (Koch, 2016). However, it was also a significant turning point for global politics since China has allegedly been forced to accelerate its own AI development due to the GO match. This shift was echoed later on by scholars as the 'sputnik moment' for China (Lee, 2019**,** Wang, 2021). Indeed, improvements in AI did not merely serve as a driving force for China's future interest in the technology realm. In the ensuing year (2017), Russian President Vladimir Putin delivered a speech (oft quoted in the literature) emphasizing the significance of artificial intelligence, reflecting a broader global awareness of its implications and potential impact: "Artificial Intelligence is the future not only for Russia but for all mankind... Whoever becomes the leader of this sphere will become the ruler of the world" (Gigova, 2017, para.3). Another recent well-known breakthrough in AI was Open AI's GPT-4 (based on Natural Language Processing) that has the ability to generate images and sentences through prompts which Microsoft research team claim that "Given the breadth and depth of GPT-4's capabilities, we believe that it could reasonably be viewed as an early (yet still incomplete) version of an artificial general intelligence (AGI) system'' (Bubeck et al., 2023, p.1). Today, artificial intelligence possesses the ability to identify patterns, diagnose patients, provide assistance to humans in various contexts, and help in critical situations, such as search and rescue missions along with having numerous applications in facial recognition, battlefields, research and development, logistics, and transportation. Despite these capabilities, AI is not without its flaws and remains vulnerable to likely misuse. As a result, one could possibly ask: What exactly is AI? And how does the current thesis define AI? Simply put, there is no universally agreed-upon definition of AI among scholars, and it is onerous to devise a comprehensive definition that encompasses all aspects of the subject in question. John McCarthy defines AI as "the science and engineering of making intelligent machines" (Manning, 2020, p.1). Russell and Norvig (2010) define artificial intelligence by integrating concepts of rational thinking and action, emulating human behavior, while Wang (2008) offers a classification of AI definitions based on five distinct dimensions: structure, behavior, capability, function, and principle. In this thesis, the definition of artificial intelligence is drawn from Frankish and Ramsey (2014, p.1), who outline AI as: "Cross-disciplinary approach to understanding, modeling, and replicating intelligence and cognitive processes by invoking various computational, mathematical, logical, mechanical, and even biological principles and devices".

4.1.1 Data

From the dawn of civilizations thanks to the invention of writing and establishment of bureaucracy (along with many other factors), data has played a critical role in our lives, informing decision-makers, individuals, and private entities. Indeed, the inception of civilizations marks a period of more systematic data collection and storage. However, the history of data can be traced back even further, to roughly 20,000 BC (Upper Paleolithic Era), when humans generated their earliest known piece of data, etched onto the relic known as the *Ishango Bone* (Pletser, 2012). Over time, humanity's efforts for classifying, analyzing, and generating meaningful insights from available data has expanded significantly, eventually facilitating the effective implementation of bureaucratic, economic, and societal practices and relationships. A prominent example of data-driven analysis can be found in the 17th-century work of British draper John Graunt. His study, titled *Natural and Political Observations Made Upon the Bills of Mortality*, collected and examined health data, enabling the government to distinguish between epidemics and chronic diseases, and to observe demographic changes in the UK (Connor, 2022). In the following centuries, acquiring and extracting meaning from data has become increasingly important not only for governments but also for individuals. This is exemplified by Freidreich's (2017) study, which unpacks that during the early modern European period (spanning from the late 15th to the late 18th century), genealogists were employed by affluent individuals to unveil ancestral data, with the objective of strengthening their political and material power.

As technological improvements continue, fields such as census-taking, mapping, and even museums (considering the context in which exhibitions display historical artifacts and data) have become more data-centric, eventually authorities—be they states, private companies, or individuals—have gained substantial control over populations due partly to their ability to classify, analyze, and ultimately derive meaningful insights from the data gathering, processing, and analysis process (Isin and Ruppert, 2020). Michel Foucault sought to unfold the underpinning dynamics of this process with the concept of ‘dispositif,’ wherein power relations are unceasingly structured across centuries via knowledge, institutions, practices, and techniques (Larroche, 2019). Evidence with regard to the impact of data on realpolitik can be found in Bouk's (2017) study, which demonstrates that data gathering, and processing have become gradually embedded in, and thus exerted greater influence on, the daily lives of US citizens. This shift has occurred through three significant acts over the course of two centuries, as conventional institutions such as government entities, universities, and companies have come to rely heavily on data (including personal data) to maintain their core functions.

In our modern days, data is all about power and is considered a non-rival good, which can be readily extracted by governments and private companies for iterative use, contrary to conventional goods that are subject to limited usage (Slaughter and McCormick, 2021). This reality ultimately results in an asymmetry among states, private companies, and individuals, primarily because data serves as a valuable resource for those who control it. Andrejevic (2014) refers to this imbalance as the 'Big Data divide'. Perhaps, one of the most recent and staggering examples of this divide was the Cambridge Analytica scandal, in which Facebook sold more than 50 million users' data without their consent to the British consulting firm Cambridge Analytica for the aim of political advertising (Isaak and Hanna, 2018). More seriously still, data has increasingly become central to international trade, with data exchanges, sales, and purchases becoming commonplace transactions for companies via the burgeoning international data marketplaces (Huang et al., 2021). Given the projections estimating the value of the data-driven market at $2.5 trillion by 2025, although different estimates and methodologies exist to measure data's value, it is plausible to argue that the future of states and societies will predominantly be data-based. This is evidenced by the already omnipresence of data in our lives (Azcoitia and Laoutaris, 2022; Mitchell, 2022). This phenomenon is also apparent in the ambitions of big tech companies to amass as much data as possible (as discussed in the following paragraph). Consider, for instance, the social media platform Facebook. Li et al. (2018) argue that when Facebook went public in 2011, its estimated value was approximately $6.3 billion, yet its market value soared to around $104 billion in the same year. According to Li et al. (2018), the primary reason for this massive gap was the value of the company's intangible assets, with data being the predominant factor

Sensors in 'smart' cars, cellphones, home assistants such as Amazon's Alexa, smart TVs, online broadcasting platforms such as Netflix, geolocation apps and many others have emerged as modern 'data hunters'. This development is driven not only because data collection serves as a profitable venture for major technology companies, but also because amassing more data enables enhanced precision targeting through the reinforcement of algorithms. Consider, for instance, the US technology and retail giant Amazon, which announced its acquisition of the high-end grocery store Whole Foods in 2017 (Wingfield and Merced, 2017). While the transaction initially appeared to be an ordinary business deal for many observers, it later became apparent that one of the underpinning motivations for Amazon was to gain access to customers' shopping data. This was echoed by Sadowski (2020, p.28) as:

"*For Amazon, stores like Whole Foods are not extracting and exploiting anywhere near as much data about customers as they could be. Even before the acquisition, Amazon had been testing ways of transforming stores into fully surveilled, datafied, auto- mated places. In its smart stores, called Amazon*

Go, you scan your phone on walking in, grab your groceries, and just walk out. No check out necessary; your account will be autobilled. In return for this convenience, Amazon will track your location and behavior via hundreds of small cameras throughout the store equipped with analytics software—where you browse, how long you linger, and what you pick up and put back"

A plethora of case studies could be found in both authoritarian and democratic states, demonstrating how data has become integral to sustaining domestic economies while also posing potential national security threats (e.g., the Edward Snowden case) (Chun, 2021; Iversen and Rehm, 2022; Ruppert et al., 2017). Simultaneously, managing data is getting increasingly complicated due to the delicate equilibrium among privacy concerns, economic growth, and national security priorities. This argument does not necessarily mean that states and supranational institutions lack robust and effective data regulations, as evidenced by the EU's General Data Protection Regulation (GDPR). Instead, the aforementioned examples indicate that data has become a more valuable resource in recent years, particularly due to advancements in machine learning in the 2000s. Some scholars even assess the significance of data through the concept of 'data colonialism' (as mentioned in the literature review), wherein states (typically authoritarian countries) and private companies are regarded as transforming into modern data colonizers. Couldry and Mejias (2020, p.35) define 'data colonialism' as "a term for "the extension of a global process of extraction that started under colonialism and continued through industrial capitalism, culminating in today's new form: instead of natural resources and labor, what is now being appropriated is human life through its conversion into data". Similarly, Gray holds the view that datafication not only represents a new frontier of colonialism (or capitalism in broader terms) but also serves as a force that reshapes the hierarchy of knowledge by leveraging control over data (2023).

4.1.2 Algorithm

While algorithms are often perceived as a product of the 21st century, their historical roots can be traced as far back as the Babylonians in 1800-1600 BC, as documented by Knuth (1972). Prominent computer scientist Pedro Domingos (2015, p.1) famously put: "If every algorithm suddenly stopped working, it would be the end of the world as we know it". Though the quote might appear overstated, in today's world, equally as significant as data, algorithms have increasingly permeated the daily life of individuals. Our digital consumption, including almost every aspect of our life from our online viewing habits to our reading selections, is being curated by cutting edge algorithms. This infers a parallel with data-human dynamics, positing algorithms as potential instruments within power hierarchy. The rapid

transformations characteristic of the digital era have significantly altered traditional understanding of concepts such as power, control, dominance, and identity, among others. For instance, how we define authority is subject to a change for Pasquale since "authority is increasingly expressed algorithmically" (2015, p.8). The concept of algorithmic power or 'politics of algorithms', however, manifests itself in algorithms' "ability to make choices, to classify, to sort, to order and to rank. That is, to decide what matters and to decide what should be more visible" (Beer, 2017, p.6). Simultaneously, actors (involving individuals, big tech corporations and states) create their own algorithmic culture that predominantly rely on human labor, material resources and ideological choices (during the creation process of algorithms) since algorithms are not only codes but also a part of structure that encompasses architectures, platforms, gateways, portals, and objects (Finn, 2018; Mager, 2012; Striphas, 2015). For some, the new digital era represents an overwhelming domination that "the ruling class has captured computational resources and are using them to drive their class agenda" (Timcke ,2021, p.4). This argument is similarly put forth by Burrell and Fourcade (2021). They posit that the coding elites, a distinct class exerting primary control over the technological sphere, have accumulated substantial power. This power is derived from their predominant control over digital tools that extract labor from marginalized and non-remunerated workforce.

The observable repercussions of algorithmically automated decisions are readily discernible in different contexts within contemporary society. For instance, an unfavorable credit score, attributable to credit scoring algorithms, could impose financial burdens amounting to thousands of dollars while predictive policing tools, underpinned by algorithmic systems, might unjustly categorize an individual as a potential criminal threat according to his/her background (Pasquale, 2015). Similarly, in the sphere of employment, algorithmic recruitment methods could inadvertently curtail one's access to job opportunities whilst in the realm of e-commerce, persuasive algorithms could prompt the superfluous purchase of items. Consequently, these instances underscore the pervading influence of algorithms in shaping the experiences of individuals in modern life. Yet surpassing the confines of individual lives, algorithms have begun to pervade the strategic agendas of states. For example, a considerable proportion of military institutions are fervently seeking to incorporate algorithms into their military doctrines, particularly in ascertaining and forecasting adversary actions, and in determining the required personnel deployment on the battlefield (Phillips, 2022). Moreover, the advent of autonomous weapons, governed by their embedded algorithms, necessitates the contemplation of a new epoch in warfare (Roff, 2014). This era is underlined by Liljefors et al., (2019, p.2) as "The evidence of the effects of algorithmic warfare available to us today is much more difficult to make sense of than any such

demonstration of the effects of the atom bomb would have been". Beyond this, it is primarily the developed countries that have escalated the infusion of algorithms into their local socio-political domains for the governance of cities, populations, and institutions. Danaher (2016) terms this endeavor as 'algocracy', a circumstance in which algorithm-based structures acquire dominance over the course of individuals' lives, and the conventional bureaucracy evolves into an extensive digital entity. Examples of this trend are pervasive and diverse, spanning from smart cities and judicial systems to reputation systems, all contributing to the creation of a digital order and government mechanisms (Katzenbacht and Ulbricht, 2019 Niiler, 2019).

Therefore, it would not be hyperbolic to assume that artificial entities will have the capacity to shape the interactions among states, corporations, and society, establishing or at the very least delineating boundaries, had computer science meet expectations in the future. In technical parlance, an algorithm is defined as "any well-defined computational procedure that takes some value, or set of values, as input and procedures some value, or some values, as output" (Cormen et al., 2022, p.5). Mac Cormick characterizes algorithms as "a precise recipe that specifies the exact sequence of steps required to solve a problem" (2012, p.3). Simply put, algorithms can be construed as mathematical formulas or models that facilitate the processing of data to achieve specific results. With their pervasive influence in contemporary life, it is unsurprising that scholars have begun to scrutinize how these mathematical constructs are reshaping politics, society, economics, and international relations at large. For instance, at the individual level while datafication renders everything into measurable entities, algorithms help big technology companies and states alike by clustering available information to establish algorithmic identities where specific behavioral faculties can be predicted, controlled and manipulated (Cheney-Lippold, 2017). Ultimately, this argument suggests that the role of algorithms extends beyond social relationships, significantly impacting the realm of politics due to algorithmic biases and inequalities pertaining to race and gender that pervade virtually all nations globally. Bucher (2018) cogently employs the term 'programmed sociality' as a heuristic tool to delineate the politics of algorithms, referring to this as a governance mechanism enacted through technology. To further pinpoint the political ramifications of algorithms, Cho et al. (2020) hold the view that YouTube's recommender algorithms serve to reinforce the ideological leanings of individuals who are politically engaged, thereby intensifying the polarization within the political realm. Reinforcement effect of the algorithm creates another hidden problem. If the algorithms are so powerful that alter individuals' behavior (as in the case of political polarization), then who has an agency given both the limited government scrutiny of algorithms that companies employ and private character of algorithms? (Kalpokas, 2019). Mau points out: "If

everything we do and every step we take in life are tracked, registered and fed into evaluation systems, then we lose the freedom to act independently of the behavioural and performance expectations embodied in those systems" (2019, p.3). This argument also highlights a gap between algorithm creators and users across various applications (Simons, 2023). For instance, it is normal to anticipate that an engineer who develops an algorithm for a predictive policing system may have limited knowledge regarding the diverse range of threats faced by police officers or may struggle to fully comprehend the operational environment in which they operate. This further compounds the issue of algorithmic bias, contributing to the blurry nature of agency within the era of algorithmically-driven devices. It also raises complex questions regarding accountability in cases of misconduct: should the responsibility lie with the application, or the human operator? At the end of the day, the ramifications of algorithms constitute a bifurcated spectrum both in politics and social life as outlined by Beer (2017). Firstly, the ways in which algorithms redesign "organization, institutional, commercial and governmental decision-making" (Beer, 2017, p.5). Secondly, the power of algorithms has capability to determine opportunities and outcomes since algorithms have a considerable say in" shaping how people are treated and judged" (Beer, 2017, p.5).

Adopting a culinary metaphor for the concept of artificial intelligence, we can analogously posit AI as a complex dish. In this framework, the algorithms may be thought of as the recipes guiding the creation process, the computational power represents the kitchen appliances that facilitate the preparation, and the data symbolize the ingredients essential to the resultant dish. In the end, the creation of cutting-edge algorithms for AI systems necessitates human talent. This remains true even when, due partly to the 'black box' nature of certain algorithms, their human designers may not completely grasp their specific operations (Knight, 2017). This requirement for human ingenuity persists, despite some AI programs possessing the capability to autonomously generate or adjust readily available algorithms.

4.1.3 Computational power

Computational power or computing power, representing the last component of the foundational triad of AI, essentially refers to a computer's capability to perform complex calculations and process extensive data to accomplish specific tasks. This concept fundamentally corresponds to two distinct yet interconnected facets. Initially, the duration expended by a computer system in processing data or executing complex processes delineates the boundaries of its computational capability. Subsequently, the concept of computational power, while inherently implying the computer's capacities, also

incorporates the hardware employed within such systems, including integrated circuits (microchips) and semiconductors. Currently, computational power assumes a crucial role in AI's advancement, not merely because engineers design machine learning models based on available hardware at their disposal, but also due to its indispensable function in executing complex tasks, thereby actualizing AI in the form we recognize today (Zhu et al., 2023).

Integrated within this understanding is the recognition that computational power is key for processing large data volumes, often required for AI applications such as deep learning. It further facilitates complex mathematical operations inherent in AI algorithms and serves as the backbone for real-time processing and decision-making. The need for computational power escalates proportionally as data volume and AI model complexity grow, pointing towards its critical role in ensuring scalability (Hwang, 2018). At the same time, sufficient computing resources speed up the training time for AI models, which directly influences the pace of development and deployment in AI-driven research and development environments. Finally, the capacity for parallel processing, inherently associated with high computational power, is fundamental for executing various AI tasks concurrently. Thus, computational power's integral role in AI spans a broad range of operational, developmental, and strategic aspects, aligning closely with the broader objectives of efficiency, speed, and accuracy (Zhou et al., 2022).

Beyond the purely technical considerations surrounding computing power, there exist multiple consequential impacts that are often overlooked. Hwang (2018) suggests the idea that the influence of computing power is not confined to tangible hardware, but rather encompasses distinctive geographical and political landscapes. As articulated by Hwang (2018, p.7):

*"The contours of computational power play a role in defining who has control over and access to the benefits of machine learning, and the actors that will play a role in its governance. It plays a role in the politics of technology, both at the level of an individual citizen and in the broader competition between state*s".

This argument gains considerable validity, especially in light of the repercussions following the outbreak of the Covid-19 pandemic. The global supply chains have undergone significant disruptions due to imposed lockdowns, with particular emphasis on the semiconductor production issues, which have become increasingly apparent (Chowdhury et al., 2021; Ramani et al., 2022). While industries tied to computational power (hardware, broadly speaking) have surmounted the disruptions instigated by Covid-19, the path forward for the advancement of AI still presents formidable challenges. This is largely attributable to the increasing demand for substantial computational power as artificial intelligence systems evolve towards heightened sophistication. OpenAI, a prominent US firm, divulged that its GPT

model, unveiled in 2020, necessitated computational power approximately 600,000 times greater than the model's 2012 iteration, in terms of both energy and hardware requirements (Lohn and Musser, 2022). A similar trend was observed across the spectrum of AI applications, which experienced a 300,000-fold increase in computing power demands between 2012 and 2018 (Hao, 2019). Moreover, AlphaGO, an AI-driven Go player, a product of Google's DeepMind, reportedly cost around $35 million to execute a single task, utilizing 1920 Central Processing Units (CPUs) and 280 Graphics Processing Units (GPUs) (Schwartz et al., 2020).

Computational power, however, is not simply a matter of hardware expenditures. Rather, a comprehensive and efficient computing system necessitates the integration of three vital ecosystems and the acknowledgment of their associated costs. Firstly, the establishment of a High-Performance Computing (HPC) infrastructure is essential. This refers to a networked cluster comprising high-speed computers, incorporating GPUs, CPUs, and Tensor Processing Units (TPUs) (Hager and Wellein, 2010). Subsequently, the high energy expenditures of AI must be recognized. While the financial implications can be formidable, a myriad of proposed methodologies for cost reduction exist, encompassing Green AI, cloud computing, and quantum computing (Brynjolfsson et al., 2019; Dunjko and Briegel, 2018; Etro, 2015). Case in point, the energy consumed in training a single AI system for Natural Language Processing purposes can parallel the energy footprint of an automobile over its entire lifecycle, inclusive of the manufacturing process (Strubell et al., 2019). Lastly, accessibility to cloud-based data storage is integral to a comprehensive computational power process. The costs of this component may vary, contingent on data volume and geographical location. Upon comprehensive examination, three key conclusions can be derived. Firstly, computational power mandates meticulously organized resources, encompassing hardware, data storage, talent, robust technological infrastructure, and efficacious strategies to counterbalance anticipated costs. Secondly, the continual advancement of AI towards more sophisticated capabilities exponentially escalates the demand for computational power, thereby complicating the development of AI systems. This is largely due to the scarcity of natural resources (rare earth elements) utilized for hardware production, hence underscoring the necessity for cost-effective alternatives. Finally, considering the escalating costs and resource requisites, it is plausible to argue that computational power will become a focal point in the agendas of both developing and developed nations. As a consequence, the rise in trade barriers, notably between major players like China and the US, especially in the domain of semiconductors and other vital components for AI model development, should not be unforeseen. The competition for computational power could feasibly morph into a zero-sum struggle, a process that is arguably already in motion, particularly between China and the United

States in the forthcoming years. This viewpoint holds, notwithstanding the resilient economic interdependence these countries maintain across various sectors of the global economy.

Chapter 5: China's AI mobilization and extraction strategies under assessment

5.1. The systemic dimension of China's AI policy: Stimuli and clarity

5.1.1. Systemic stimuli: Permissive and restrictive strategic environment

From the perspective of state action theory, China is currently navigating a pivotal juncture, shaped by two intersecting factors compelling Beijing to concentrate on resource extraction and mobilization. Firstly, the strategic environment has undergone significant transformation: initially characterized as 'restrictive' (up until the 1970s), then transitioning to a 'permissive' phase (lasting until the early 2010s), and now gravitating back towards a more restrictive environment (beginning in the late 2010s and continuing into the early 2020s). This recent shift has been defined by escalating confrontational policies between China and the West. Secondly, the advent of emerging technologies (ET) has intensified Beijing's drive to extract and mobilize resources, necessitated by the evolving nature of these resources themselves.

A retrospective examination of modern China's evolution, approached from the standpoint of state action theory, could potentially contribute to a deeper comprehension of the strategic environment that China has encountered from the establishment of the communist republic in 1949 to the present day. Upon the establishment of the People's Republic of China, the country had already inherited a myriad of internal issues, be it the detrimental consequences of warlordism, the socioeconomic disruptions stemming from Japanese invasion, the devastating political turmoil of the Republic of China (1912-1949), or the long-lasting impacts of foreign invasions during the Qing Dynasty. As such, the CCP prioritized the unification of the country as swiftly as possible, utilizing a combination of ideological campaigns, comprehensive reforms, and economic development initiatives. Teiwes (2019) posits that by 1953, the economy had been restored through the transformation of the domestic market into a Soviet-style command economy, and the CCP had succeeded in unifying the country under its control with the notable exceptions of Hong Kong, Taiwan, and Macau by 1951. Although it may seem like a

swift process for the CCP to unify the country using stringent measures and ideological campaigns, foreign influences, particularly in the form of foreign press, cultural and religious activities, were still quite palpable during that period. For instance, in 1949, the CCP conducted a survey in Shanghai to gauge citizens' movie preferences and discovered that 72 percent of audiences preferred US-made films to communist propaganda films (Garver, 2015). Meanwhile, the CCP also contended with the fallout of the Korean War during this period, managing to maintain a stalemate on the peninsula by brokering a ceasefire with US-led forces (Malkasian, 2023).

Indeed, the framework through which China perceived the outside world was underpinned by Marxist-Leninist ideology, and the Soviet Union had been assisting the Chinese Communist Party since its inception in 1921 (Tang, 1954). For Chairman Mao and CCP elites, foreign relations needed to be grounded in communist and revolutionary values. Broadly speaking, the CCP leadership's understanding of the international system was shaped primarily by Leninist ideology, which prophesied an inevitable world conflict emerging from the ideological struggle between the capitalist and communist camps (Qin, 2011). Assuming counterfactually that the CCP adopted a more flexible approach towards Western countries, the events of the 19th century, including the two Opium Wars and subsequent period often referred to as the 'century of humiliation', would likely still have engendered a cautious stance towards the West within the CCP (Kaufman, 2010). Thus, the sole viable path appeared to be to model themselves after the Soviet Union, both politically and economically, despite the palpable distinctions between the two countries. Garver (2015, p.29) characterizes this situation as follows:

"From the CCP perspective, "bourgeois democratic" forms had been tried in China after 1911 and had failed. They were tried and failed again in the post-1945 period in China. Only "the Russian model" could pull China together and lead it forward quickly. Only the Russian-model socialist economy could quickly make China a great power. Soviet advice and assistance would be necessary in this effort"

However, Joseph Stalin's decision to support the nationalists (primarily due to economic concessions in the Xinjiang and Manchuria regions) during the Chinese Civil War period illustrates that Sino-Soviet relations were not a given; instead, they were fraught with fluctuations (Lüthi, 2010)[6]. The triumph of the CCP in the Chinese civil war subsequently ushered in a formal alliance between China and the Soviet Union, culminating in the signing of the Sino-Soviet Treaty of Friendship, Alliance and Mutual Assistance in 1950 (Jersild, 2014). Opting to form an alliance with the Soviet Union also signified extending the reach of the Cold War to East Asia. This decision set a trajectory for China to operate

[6]Indeed, the fluctuations in Sino-Soviet relations were not solely attributable to the dynamic between the two communist parties themselves, but also to the personal relationship between Mao Zedong and Joseph Stalin, which was riddled with mistrust and cynicism. To read further see: (Sheng, 1992)

within a **restrictive strategic environment** concerning its foreign relations, given its firm stance against the Western world, which encompassed aspects such as culture, economy, and societal relations (Korolev and Portyakov, 2019).

Following Joseph Stalin's death, Nikita Khrushchev's ensuing speech on De-Stalinization marked a new phase in Sino-Soviet relations throughout the 1960s and 1970s. This shift, while significant, did not substantially change China's position within a globally restrictive strategic environment. The underlying reasons for the Sino-Soviet schism were more complex and nuanced than mere personal differences between Khrushchev and Mao Zedong. The split was a result of several deeply rooted elements, encompassing internal upheavals in China, such as the Great Leap Forward and the Cultural Revolution, as well as the ideological battle over who was the true epitome of Marxist orthodoxy, the CCP, or the Communist Party of the Soviet Union (CPSU) (Li and Xia, 2018). The Sino-Soviet split, however, represented fresh opportunities for U.S. policy makers to counterbalance the 'Soviet threat.' The 1970s epitomized these shifts, although suggesting that China operated in a **permissive strategic environment** during this period could be contentious as I will further elucidate in the following paragraphs. After all, the issue of Taiwan, a matter of national sovereignty for the CCP, remained unresolved. More significantly, the Cold War was in full swing, and China, despite the deterioration of its relationship with the Soviet Union, remained a formidable protagonist in the communist bloc. The Taiwan issue held such critical importance for both parties that it became a central topic during the first covert meeting between US National Security Adviser Henry Kissinger and Chinese Premier Zhou Enlai in 1971. According to memoirs and declassified documents, Zhou sternly cautioned Kissinger about this matter: " If this crucial question is not solved, then the whole question (of US-China relations) will be difficult to resolve" (Warner, 2007, p. 769). Despite ongoing disagreements, China was granted membership in the United Nations (UN) in 1971. Meanwhile, the Kuomintang regime (Taiwan) was unseated, a development that notably enhanced the global stature of the People's Republic of China (Chin and Thakur, 2010).

Subsequently, in the following year, US President Richard Nixon paid a visit to China, marking the initial discernible thaw in Sino-American relations. A detailed examination of declassified documents offers a revealing perspective on how the US perceived its relationship with China and the strategic environment within which China navigated its political and national interests. As per an intelligence analysis by the CIA (2011), issued in July 1970 under the title 'US-China Trade Potential,' China was virtually absent from US economic considerations, and diplomatic relations were severely limited. This was partly due to the escalating US trade restrictions initiated during President Truman's administration in 1949,

illustrating the extent of China's isolation within the Western world. However, a separate official document issued on August 17, 1960, titled 'Sino-Soviet Relations' suggests that the US intelligence community was keenly aware of the potential to exploit the emerging Sino-Soviet split. The intelligence analysis regarding Sino-Soviet split concludes (CIA, 2016a, p.5):

"The mounting ill-feeling between Moscow and Peiping [Beijing] and the apparently complete failure of the Bucharest conference to close the breach raise the possibility that a Sino-Soviet break similar to (but much more important than) the Yugoslav-Soviet break of 1948 could occur. The Sino-Soviet relationship can be expected to have its ups and downs, but the present downswing is unprecedented in scope and severity. A split would obviously cause a great damage to world Communism, to the Soviet Union, and, especially, to Communist China"

As previously noted, China was not poised to provide enticing products for bilateral trade with the US Perhaps, the predominant impetus for rapprochement was the divided communist world, which was apparent to the US This is perceptible in the CIA's 1970 intelligence analysis (pp. 1-3-5):

"Economic relations between the United States and Communist China have been virtually nonexistent since US unilateral controls were erected during the Korean war... Despite the liberalization of trade restrictions, most potential economic relations between the United States and China are still severely restricted... Under current restrictions on trade with Communist China, the potential level of US-China trade is small".

The death of Mao Zedong in 1976 revealed the alarming state of China's political, economic, and social structures, much of which was attributable to the calamitous policy decisions made during the Great Leap Forward and the Cultural Revolution (Gilley, 2019). For the leadership of the CCP, the Mao era offered significant lessons, though one could not realistically anticipate a process akin to the De-Stalinization that occurred post-Stalin's death, especially considering the pressing need for sweeping economic reforms[7]. To illustrate, following Mao's death, the average annual per capita income of Chinese peasants, who constituted nearly 80% of the population at that time, was a mere $40 (Vogel, 2011). Therefore, sweeping reforms, in accordance with the Communist canon, became imperative for the CCP leadership. The pivotal turning point arrived in 1978 during the third plenary session of the 11th Central Committee of the CCP, which marked the commencement of China's reform and opening-up policy[8]. Indeed, this signified the CCP's determination to launch political and economic reforms

[7] That is not to suggest, however, that there was no dissatisfaction with Mao's previous policy choices. Some CCP elites openly criticized Mao, though the paramount leader Deng Xiaoping encapsulated the collective sentiment by saying, "We are all to blame" (Vogel, 2011, p.52).

[8] During that period Hua Guofeng was the Chairman of the Party and kept nominal position until 1981 though Deng Xiaoping is generally considered as the de facto leader of CCP. Despite never officially assuming the roles of President, Chairman, or General Secretary of the Communist Party, or Premier of the

domestically, under the leadership of Deng Xiaoping, as well as a commitment to bolster its international relationships. The intention was dual-faceted: to absorb insights from global actors and to stimulate China's economic growth by any viable means (Goodman, 1994). Vogel (2011, p.53-54) depicts the zeitgeist in this period as:

"He [Deng Xiaoping] would open the country wide to science, technology, and management systems, and to new ideas from anywhere in the world, regardless of the country's political system. He was aware that the new dynamos of Asia—Japan, South Korea, Taiwan, Hong Kong, and Singapore—were growing faster than any countries ever had. But Deng realized he could not simply import an entire system from abroad, for no alien system could fit the unique needs of China—which had a rich cultural heritage but was also huge, diverse, and poor. He realized what some free-market economists did not, that one could not solve problems simply by opening markets; one had to build institutions gradually. He would encourage other officials to expand their horizons, to go everywhere to learn what brings success, to bring back promising technology and management practices, and to experiment to see what would work at home. He would help pave the way by developing good relations with other countries so they would be receptive to working with China."

Hence, it is plausible to claim that the era of reform and opening up ushered China into a more accommodating strategic environment, one that enabled greater engagement with the global economy. This is substantiated by the US and China's mutual recognition in 1979, Deng Xiaoping's subsequent visit to the US, and the enhancement of China's domestic economy through the creation of Special Economic Zones and the implementation of socialist market reforms (Fang, 2019). Nevertheless, despite these reforms and global engagement, the permissiveness of the strategic environment, particularly in the realm of technology, was still somewhat restricted for China. Within US policy making circles, there was a prevalent sense of caution concerning the intentions of the CCP.

This is reflected in the declassified CIA analysis issued on December 8, 1982, titled *The Technology Issue in US-China Relations*. The document states that (2016b, p.1-2):

" During the past several months, Beijing has expressed growing impatience with controls on US technology and it has recently asserted that this issue is the most serious irritant in US-China relations next to Taiwan...China has sought advanced US technology since 1972, and it's potential benefits for China's modernization program was a fundamental factor in Beijing's decision to improve relations with

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State Council, Deng Xiaoping did serve as the General Secretary of the Central Committee, Chairman of the Central Military Commission, and Vice-Premier of the State Council. See further Shambaugh (1993).

Washington... Deng Xiaoping and other leaders have repeatedly highlighted the discrepancy between US policy statements and performance on the technology issue... The Chinese have stressed that current restrictions indicate that the United States still treats China as a hostile country".

This analysis makes it evident that while China's reform and opening up process was in full swing, it continued to face significant constraints in terms of technology development. Additionally, domestic political upheavals in the 1980s, such as the Tiananmen Square protests, increased the restrictiveness of the strategic environment, as global responses to the CCP leadership's decision to violently suppress protests were far from positive (Trzcionka, 2008). Thus, this thesis categorizes this era as one of partial permissiveness in the strategic environment, particularly in the technology context. Remarkably, the same 1982 CIA document provides crucial insight into the degree of restrictive strategic environment that bears similarities to the current ongoing US-China tech competition and the blurred lines between military and civilian use in China's technology development (especially the debates surrounding China's Military-Civil Fusion program). It is plausible to suggest that the strategic environment's character (permissive or restrictive) manifests itself in the language and word choice of analyses, creating an impression of recurring cycles when one reviews historical narratives. This selective language use is evident when comparing the 1970 CIA document that refers to China as 'Communist China' and the 1982 document that simply uses 'China'. As highlighted in the document (2016b, p.2):

"We believe that China's primary objective is to obtain 'dual-use' US technology to serve military as well as civilian modernization goals. This technology includes sophisticated computers, telecommunications equipment, and integrated circuit manufacturing technology to name a few. In a number of cases where the United States has granted exceptions to export dual-use technology, we have evidence to show that the technology has been diverted for use in areas currently proscribed by US regulations".

It may not be an overstatement to assert that China's admittance into the World Trade Organization and its permanent recognition as the Most-Favored-Nation by the United States in 2001 signaled the dawn of a permissive strategic environment for China. This proved significant not only for its global relations but also for its domestic economy and technological advancement (Pregelj, 2001)[9]. This is not to suggest that the global political climate during this period was completely harmonious, particularly in the context of US-China relations. Certain events marked significant tensions, including the People's

[9]These advantageous developments for China can also be interpreted from an alternative angle, which involves understanding them as elements of 'inclusive institutional balancing'. This concept involves a hegemonic state inviting a competitor into an international institution, wherein the norms of that institution serve to moderate the competitor's behavior. There are historical instances where China was barred from joining certain international institutions due to U.S. exclusion (exclusive institutional balancing), such as the Trans-Pacific Partnership from 2008 to 2015. See further: He (2023)

Liberation Army's (PLA) missile tests in the Taiwan Strait from 1995-1996 and the subsequent dispatch of US Navy aircraft carriers in response to these tests. Other incidents such as the North Atlantic Treaty Organization (NATO) bombing of the Chinese embassy in Belgrade in 1999, and the collision between a Chinese fighter jet and a US spy plane in 2001 also contributed to the strained relationship (Parsons and Xiaoge, 2001; Scobell, 2000). Yet, Jiang Zemin, who was the General Secretary of the CCP at the time, recognized that Beijing's ambition to attain great power status would be unattainable without maintaining stable relations with Washington (Gilley, 2019).

The permissiveness of the strategic environment that began with the onset of the new millennium is observable in certain indicators. For example, China's annual Gross Domestic Product (GDP) growth averaged 9% between 2000-2015, surpassing Japan in 2010 to become the world's second largest economy in dollar terms (Kokubun, 2017; World Bank, 2023a). In terms of Foreign Direct Investment (FDI), the net inflows stood at $42 billion in 2000. This figure gradually climbed over the years, more than doubling to $104 billion in 2005, and reaching a peak of $290 billion in 2013, one year after the current General Secretary of the CCP and President of China, Xi Jinping, took office (World Bank, 2023b). However, the pertinent question at this juncture is to what extent the CCP has been able to leverage this economic growth and FDI to foster technological development, particularly in the realm of emerging technologies. Upon conducting an analysis of the Frontier Technology Readiness Index, as provided by the United Nations Conference on Trade and Development, it becomes evident that China's preparedness to adopt and implement frontier technologies has demonstrated a consistent pattern of growth over time[10]. For instance, China's Information and Communications Technology (ICT) deployment rate, which was a modest 0.14 in 2008, demonstrated steady growth to reach 0.46 in 2015. The overall Frontier Technology Readiness Index (incorporating metrics related to ICT deployment, the development of relevant skills, R&D activities, industry activities, and access to finance) also saw an upward trend during this period, rising from 0.25 in 2008 to 0.36 in 2015 (UNCTAD, 2023)[11]. Through an in-depth analysis of China's ICT goods exports, an explicit growth pattern becomes

[10] The Frontier Technology Readiness Index is a composite measure, encompassing a spectrum of indicators such as ICT deployment, development of relevant skills, Research and Development (R&D) activities, industry activities, and access to finance. The aforementioned components of the Frontier Technology Readiness Index align significantly with the AI triad approach proposed in this thesis, specifically in the domains of talent, data, and computing power. Concurrently, the access to finance segment of the index closely resonates with the resource approach delineated in this study, specifically with respect to overall funding mechanisms.

[11] An index value approaching 1 signifies a nation's readiness for the utilization and adoption of frontier technologies, whereas a value near 0 points to a country's lack of readiness for such technological integration.

evident. Initially, in the year 2000, the estimated value of ICT service exports stood just above $1 billion. This value witnessed a substantial increase, reaching $16 billion in 2012, a period that corresponds with the commencement of Xi Jinping's leadership. This upward trend did not plateau but instead spiked further to $26 billion in 2016, the year marking the election of US President Donald Trump (World Bank, 2023c). A parallel incline can be observed in the trajectory of ICT goods exports. While these made up 17.71% of total goods exports in 2000, they demonstrated a prominent escalation, constituting 26.5% by 2016 (World Bank, 2023d).

Without doubt, a host of factors including the domestic developments and the changing dynamics of international politics and economy, apart from FDIs and economic growth, could feasibly be contributing to the rise of China in technology and economic sectors. Yet, there's a solid case to be made that the dawn of the 2000s signaled a turning point for China, marked by remarkable strides in both technology and economic growth. This trend appears largely due to a more permissive strategic environment. Moreover, this reality has increasingly become a focal point in scholarly debates as well as political discussions. For example, during a public address in 2019, Mike Pence, who was then the Vice President of the US, unambiguously stated, "As President Trump has said many times, we rebuilt China over the last 25 years" (Nye, 2020, p.7). Such a pronouncement hints at a permissive strategic environment, irrespective of the potential speculation underlying his assertion. Similar argument was echoed as well by prominent scholar John Mearshimer as (2021, para.2):

"*Since a mightier China would surely challenge the U.S. position in Asia and possibly beyond, the logical choice for the United States was clear: slow China's rise. Instead, it encouraged it. Beguiled by misguided theories about liberalism's inevitable triumph and the obsolescence of great-power conflict, both Democratic and Republican administrations pursued a policy of engagement, which sought to help China grow richer. Washington promoted investment in China and welcomed the country into the global trading system, thinking it would become a peace-loving democracy and a responsible stakeholder in a U.S.-led international order".*

Moreover, there are contrasting narratives, such as the one presented by Stephen Hadley, the erstwhile National Security Adviser to US President George W. Bush. In a book titled 'Hand-Off: The Foreign Policy George W. Bush Passed to Barack Obama' (Hadley et al., 2023), Hadley asserts that the US has not been consistently receptive to matters concerning China, and that policy makers have been cognizant of the potential drawbacks of a rising China abetted by US assistance. Irrespective of the diversity of viewpoints, one indisputable fact stands: China's entry into the global marketplace in 2001 marked the start of unprecedented growth in both its economic and technological sectors. Moreover, the permissive

strategic environment proved considerably more conducive to China's ascent, particularly in comparison to the eras marred by ideological warfare during the Cold War.

However, the election of Donald Trump as the US President in 2016 signaled another critical juncture for China, a premonition that would be further illuminated in the 2017 US National Security Strategy, where China was identified as a challenge, accused of stealing US “intellectual property worth hundreds of billions of dollars”. Interestingly, Chinese initial reactions towards Trump's election were positive, reflecting a stark contrast with the ensuing reality (Kubo, 2019; The White House, 2017, p.21).

The subsequent years took a more adversarial turn for both parties, especially in pivotal realms such as international trade, Taiwan-related issues, and the realm of emerging technologies. The Biden administration's policy stance towards China not only carried forward the legacy of former President Trump's China policy, but it further intensified these measures, buoyed by bipartisan support. This stance is evident in recent legislation like the CHIPS and Science Act, designed to bolster the domestic semiconductor industry and foster talent growth in STEM fields. Also notable is the RESTRICT Act, which essentially bars Chinese firms from operating on US soil. Complementing these measures are the export controls and bans, particularly targeting high-tech equipment integral to AI development (Ambrose et al., 2022; Barkin, 2020). The US has not only implemented unilateral measures in recent years to restrain Chinese technological advancement but has also been rallying allies and partners to form a coalition aimed at counterbalancing China's technological prowess. It has done so by incorporating discussions on emerging technologies into agendas of key forums. These include the Quadrilateral Security Dialogue (QUAD), the trilateral security agreement known as AUKUS involving Australia, the United Kingdom, and the US, and the G7 meetings (The White House, 2023). China's policy responses mirrored that of the US, adopting what could be considered reciprocal measures. These included implementing export controls and bans, restricting operations of US companies within China, and making concerted efforts to reinforce its technological influence in various regions, particularly in Southeast Asia through platforms that are akin to above mentioned ones such as Global Security Initiative (GSI), Global Development Initiative, Global Civilization Initiative (GCI), and Digital Silk Road Project (DSR) under the Belt and Road Initiative (BRI) (Ministry of Foreign Affairs of the People’s Republic of China, 2023a; Stangarone, 2023). Nonetheless, a close examination of China's Foreign Relations Law, ratified in 2023, reveals a clear understanding within China of its external relations reflecting the restrictive strategic environment within which it currently operates. In the document it is stated that (Devonshire-Ellis, 2023, para. 16) :

"China has the right to take corresponding countermeasures and restrictive measures against acts that violate international law and basic norms of international relations and endanger the sovereignty, security, and development interests of the People's Republic of China. The State Council and its departments formulate necessary administrative regulations and departmental rules, establish corresponding work systems and mechanisms, strengthen departmental coordination, and determine and implement relevant countermeasures and restrictive measures"

In addition to this, the paragraph underscores a perception within the leadership of the CCP that China is being contained. This was explicitly stated during a 2023 CCP Central Committee meeting, where Chinese President Xi Jinping declared, "Western countries led by the United States have implemented all-around containment, encirclement, and suppression of China, which has brought unprecedented severe challenges to our country's development" (Bradsher, 2023, para.3). Considering the aforementioned policy developments, it is reasonable to contend that the strategic environment for China, in relation to the advancement of emerging technologies, has indeed become more restrictive, particularly since the election of US President Donald Trump. Therefore, this dissertation classifies the period post-2016 as one characterized by a partially restrictive strategic environment for China, specifically in the domain of AI development. The rationale behind categorizing this period as a 'partially restrictive' as opposed to a wholly 'restrictive' strategic environment in the context of AI development is twofold. Despite escalating tensions between the two nations over recent years, achieving total technological decoupling is practically unfeasible unless both nations are prepared to absorb substantial economic risks. This situation brings us to the concept of a relationship that is 'too big to fail,' demonstrating the degree of mutual interdependence between the two countries. Consider, for example, that China remains the top goods supplier to the US, with exports totaling $536 billion in 2022, while the US ranks as China's third largest exporter, following South Korea and Japan, with nearly $180 billion exported in 2022 (Statista Research Department, 2023; The United Nations Comtrade Database, 2023). Secondly, although an ongoing tech decoupling between China and the US will undoubtedly impede AI development for both parties, the research and development collaborations between US and Chinese scientists and universities hint at a strategic environment that, while becoming more restrictive, has not fully tightened. As indicated by Stanford University's 2023 AI Index Report (2023), the United States and China had the most cross-country collaborations (including AI publications), a figure which has increased roughly fourfold since 2010. Therefore, despite the ongoing technological decoupling, this dissertation classifies the period following 2016 as a partially restrictive strategic environment.

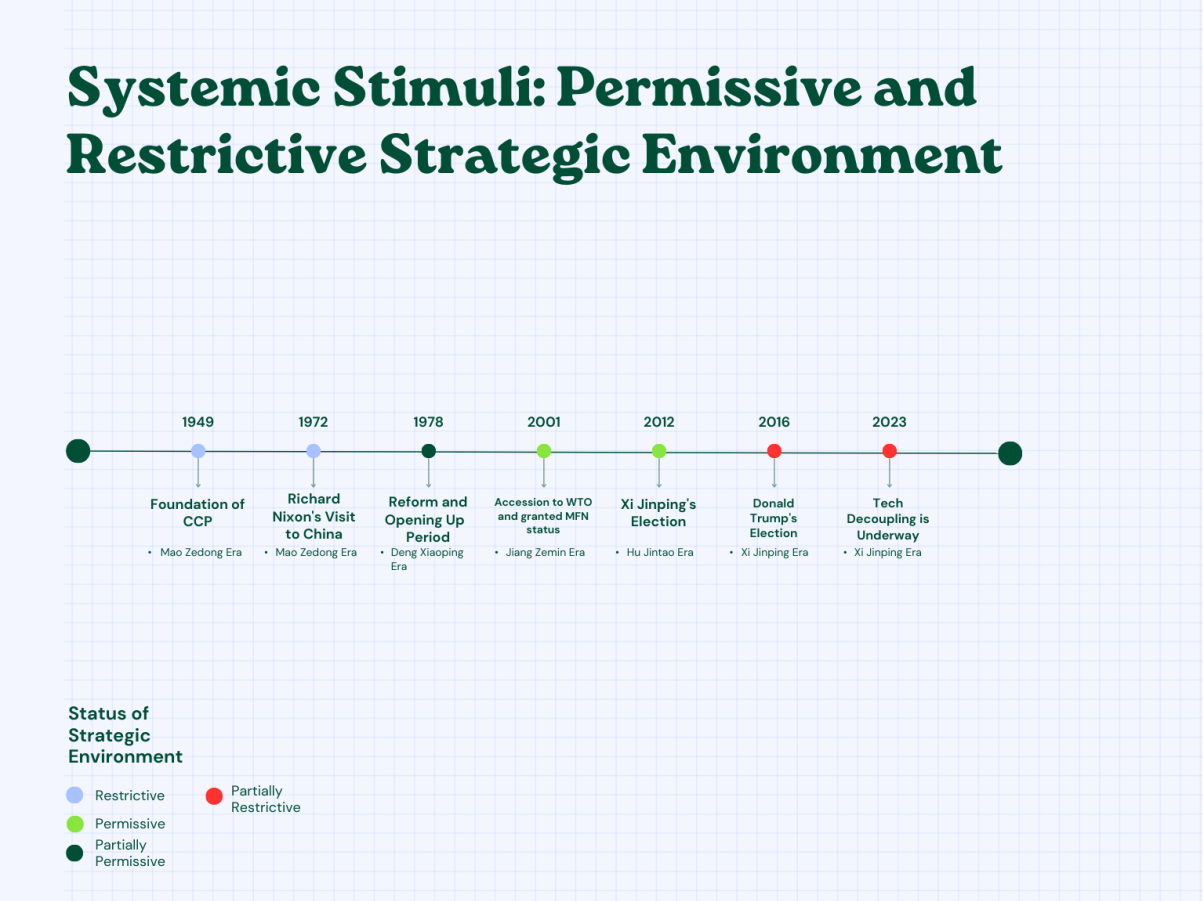


Figure 7. Systemic stimuli: Permissive and restrictive strategic environment (Source: Author's compilation)

5.1.2 Systemic clarity: High, medium and low levels of opportunities and threats

Beyond focusing on the strategic environment of individual states, exemplified here by China, the notion of systemic clarity emerges as an influential factor shaping state-level policy decisions and agendas. This section offers an in-depth exploration of systemic clarity, investigating how China interprets developments in global affairs, specifically those pertinent to its own AI development. The subsequent analysis is t founded on three core premises outlined in my theoretical framework. As suggested by Ripsman et al. (2016, p.46), clarity is constituted by three primary elements: first, "the degree to which threats and opportunities are readily discernible," second, "whether the system provides information on the time horizons of threats and opportunities," and finally, "whether optimal policy options stand out or not." Combining these three components allows us to form an overarching premise: systemic clarity is

contingent upon the transparent identification of risks and opportunities, comprehension of their projected timelines, and the salience of the most effective policy alternatives.

Analogous to the restrictive strategic environment, at the outset of its foundation in 1949, the People's Republic of China faced an international system that appeared antagonistic towards China's future prospects. After all, these were the same powers that, centuries ago, capitalized on the frailty of the Qing Dynasty and occupied China (Scott, 2008). Most crucially, the threat was not only from distant countries but also from neighboring nations. Japan, for instance, invaded China and committed severe atrocities, as evidenced by incidents like the Nanking Massacre, inflicting grave harm on the 'Middle Kingdom' (Yoshida, 2006)[12]. Following the fall of the Qing dynasty and the establishment of the new republic in 1912, China was unable to address the issues it had been grappling with for decades, culminating in the widespread student protests in 1919, famously known as the May 4th Movement (Gu, 2001; Schwarcz,1986). This outcry was not just a response to the Versailles treaty, which permitted Japan to assume control over areas in Shandong previously under German rule. It was also a search for a new path for China's future, symbolized in the concepts of Mr. Science and Mr. Democracy, which represented potential solutions for the Chinese youth. However, the end of the Chinese Civil War in 1949 also marked the beginning of a new era for Chinese revolutionaries, reminiscent of the aspirations once embodied in the May 4th movement. Though it should be noted that the underlying motivations of these two periods are not necessarily identical. The employment of terms like "new path", "new era", or "new actor" in my narrative is not a creative choice aimed at engaging the reader, but rather a direct reference to terminology used in an official CCP document. This document, *Formulation of Foreign Policy of China on the Eve of its Birth* (Ministry of Foreign Affairs of the People's Republic of China, 2023b), provides a foundational understanding of the People's Republic of China's perspective on its foreign policy. As the document points out "Between the spring and summer of 1949, Chairman Mao Zedong advanced the principle of 'Starting anew', 'putting the house in order before inviting guests' and 'leaning to one side'" (Ministry of Foreign Affairs of the People's Republic of China, 2023b, para.2). While these principles may initially seem unconventional, they fundamentally signify the unique underpinnings of Chinese foreign policy. The principle of 'starting anew' implies a complete overhaul of the diplomatic relations established by the Kuomintang during the Republic of China period, coupled with a thorough reassessment of all treaties and bilateral agreements

[12]The term 'Middle Kingdom', translating to 'Zhongguo' in Chinese, is simply another way of referring to China.

signed by the so-called 'Old China'. The phrase 'putting the house in order before inviting guests' symbolizes the replacement—or more dramatically, the uprooting—of bourgeois culture and habits with communist values, a process which the document eloquently describes as having "gradually cleared up the prerogatives and influence the imperialist countries had in China" (Ministry of Foreign Affairs of the People's Republic of China, 2023b, para.3). Finally, 'leaning to one side' serves as a declaration of China's alignment with the socialist camp.

When one factors in the profound indoctrination of communism, including ideological rectification campaigns and mass propaganda, it becomes apparent that the CCP leadership's worldview was starkly polarized into 'us' versus 'others.' The 'us' represented a newborn Marxist-Leninist state within the communist camp, operating under the expansive shadow of the Soviet Union and brimming with opportunities. In contrast, the 'others' were perceived as capitalists, imperialists, and malevolent forces aiming to propagate bourgeois habits and culture. Hence, any policy decision by an actor, such as the US intervention in the Korean War, was interpreted as anti-communist (a perception which might hold some truth considering the context of the Cold War), and the threat was perceived as imminent. Especially for the supreme leader Mao Zedong, gauging the potential impact of US actions on the security and survival of the CCP was always a crucial concern (Di, 1994). Furthermore, as long as China remained in the communist bloc, it was deemed susceptible to foreign subversion and malevolent activities. Consider, for example, Mao Zedong's speech given in 1959, which serves as an illustration of his threat perception and the timeline he envisions. In his own words, he articulated (Wilson Center, 2023, para.1):

"The scope of the discussion is to be expressed by myself. What are the enemy's tactics?[Waving] the flag of peace, building lots of missiles, establishing lots of [military] bases, preparing to use war to eliminate socialism. This is the first.[Waving] the flag of peace, [through] cultural intercourse and personnel exchange, prepare to use corrosion [fushi] to eliminate socialism. This is the second.Self-preservation and elimination of enemies is the fundamental concept [we should follow].[The enemy's strategy]: Sometimes conciliating, sometimes strained; Conciliating here, straining there; Conciliating in Europe, tense in Asia; Striving the opportunists, isolating Marxism-Leninists. Has revisionism already been systemized and will it determinedly continue? Maybe it's that way, but maybe it can still be changed. Maybe it is long term (for example, more than 10 years). Maybe it is short term, for example, 1-4 years".

However, this line of thinking also presented opportunities. Not only did it provide China with the objective of becoming the ideal model of the communist world or the representative of the third-world nations, but it also facilitated Mao Zedong in consolidating his power by rallying the masses under his 'red banner'. Even the motivations underlying Mao Zedong's strategic domestic policy decisions were directly tied to the CCP's perception of systemic clarity (opportunities and threats). Consider, for instance, the Great Leap Forward campaign (also known as China's second Five-Year Plan) which was designed to revolutionize the Chinese economy by harnessing agriculture and industry in line with socialist doctrine. While setting a target for steel production, Mao anticipated that China would overtake the United Kingdom within 15 years, a benchmark indicating a response to a potential threat. He often lauded progress in the communist world while alluding to foreign threats and drawing comparisons. For example, in his speech from 18th November 1957, he noted: "The Soviet Union has launched two sputniks. How much steel did they have when they managed to do that? Fifty-one million tons. But aren't the United States supposed to be formidable? Then why have not they been able to launch even a pellet, what with their hundred million tons of steel, their boasting and their Vanguard project" (Schoenhals, 2007, p.117)[13].

The Cultural Revolution, another significant domestic campaign, was similarly laden with both threats and opportunities for the CCP leadership, especially for Mao Zedong. Threats emerged in the form of bourgeois infiltrators, influenced by Western cultures and ideals, while opportunities arose in the form of quelling dissenting voices, driven by fear of meeting a fate similar to Stalin's in light of the events that unfolded during the de-Stalinization period (Lee, 1978). It's important to note that the Sino-Soviet split turned the Chinese relationship with the Soviet Union from one of alliance to outright hostility. This transition escalated to the point where the very existence of the Soviet Union was perceived as an existential threat by China, in some instances considered more threatening than Western countries. This assertion holds weight when considering the shift in Mao Zedong's perception of threats following the visit of US President Richard Nixon to China. As Di (1994, p.146) argues "Finally after almost 60 years and the near the end of his life, Mao witnessed the relaxation of tensions between China and the United States and the beginning of joint efforts to resist, not Japan, but the Soviet Union".

[13] In 1958, Mao Zedong introduced a new slogan: "Exceed the United Kingdom and catch up with the United States" (Pinyin: Chaoying Ganmei).

This change in relations provided new opportunities for China in terms of technological development, enabling it to diversify its technological ecosystem without having to rely solely on Soviet technological assistance. However, as discussed in the previous chapter, the frustration of CCP leadership regarding the constraints on US technology transfers was evident, despite the easing of tensions. At the end of the day, both parties retained a degree of skepticism towards each other. The CCP leadership still "Vividly remembered the encroachment of Western imperialism in the nineteenth century and regarded the United States as one of the principal beneficiaries of economic and political privilege in China". In return "Many Americans perceived China as an aggressive and irrational power whose support for revolutionary movements around the world made it an even more dangerous adversary than the Soviet Union" (Harding, 2000, p.3). However, the rapprochement that began in 1972 yielded significant outcomes in the sphere of technology development, particularly post-1978. As previously discussed, Deng Xiaoping, the architect of the 'opening up and reform' era, encouraged Chinese students to study abroad, with a special focus on STEM fields. In 1978, 52 Chinese students went to study in the US. This number soared dramatically to 78,000 by 2001. Between 1978 and 2001, a total of 189,000 Chinese students pursued their education in the US (Xiaoming, 2003).

Yet, despite the continuous increase in the number of students sent to the US for science and technology education, cooperation between China and the US was tethered to political realities. Notably, the 1989 Tiananmen Square protests prompted a shift in China's perception of threats. Nevertheless, the period of reforms and opening up was an unprecedented opportunity for the advancement of science and technology in China, notwithstanding the challenges (Suttmeier, 2014). This era also coincided with the collapse of the Soviet Union, an event that heralded both threats and opportunities for China. The opportunity came with China's rise as the most formidable communist country, characterized by surging advancements in technology and industry. Some scholars suggest that this could translate into a period of peaceful rise in the subsequent decades, particularly following 2001 (Mearsheimer, 2014).

Simultaneously, the end of the Cold War and the disintegration of the Soviet Union imparted critical lessons to the CCP leadership (Marsh, 2003). Specifically, a tolerance for liberal values (a robust threat) could spell disaster, as demonstrated by the Tiananmen Square incident, and as evident in the disastrous outcomes of Gorbachev's policies of *glasnost* and *perestroika* (Sharma, 2021). This harsh reality amplified the CCP leadership's nationalist rhetoric during Jiang Zemin's tenure, leading to the evolution of a potent techno-nationalism in later decades, a phenomenon that I will delve into as a

domestic intervening variable in the following chapters (Gilley, 2019). Lessons were also drawn in the technology realm, echoing Deng Xiaoping's philosophy of 'copinism' - a concept that essentially advocates for mimicking Western technology and learning from Western nations (Hillman, 2021).This claim is particularly pertinent for China's tech behemoths such as Huawei, which expended $1.6 billion on consulting services from Western companies between 1997-2012, particularly the US technology giant IBM, which played a pivotal role as Hillman elaborates (2021, p. 37) “What IBM thought would take nine months stretched into a seventeen-year endeavor to transform Huawei”.

However, the 'copinism' or copy-cat culture began to morph into a uniquely innovative tech ecosystem for China following its accession to the World Trade Organization (WTO). This transition was especially marked by the 2006-2020 Plan for the Development of Science and Technology in the Medium and Long Term, which signified a turning point for Chinese technology development, with a new focus on cultivating indigenous technology (Lundvall and Rikap, 2022). While the U.S. was preoccupied with its 'war on terror' campaigns in Iraq and Afghanistan, an unparalleled opportunity presented itself for China and its tech companies to expand. This momentum was further fueled by the 2008 financial crisis, which empowered the CCP leadership to hasten their tech expansion. Concurrently, the 2008 Beijing Summer Olympics served as an ideal platform to showcase China's capabilities to the world (Chen et al., 2012; Xu, 2006). Then came Xi Jinping's era, introducing a renewed vision of the 'China Dream' or Chinese national rejuvenation in 2012. According to Xi, the West was on a path of decline, as predicted by Marxism's historical materialism, and the collapse of capitalism was inevitable (Rudd, 2022). Therefore, it can be convincingly argued that the CCP leadership perceived the 2000s as a period of growth and development. Despite the potential threats posed by Western states to China's unity, opportunities appeared to outweigh these threats and constraints. As Xi Jinping stated in a 2021 speech at the Central Party School in Beijing, "time [history] and momentum are on our side" (Erling, 2021, para.2). This demonstrates a prevailing belief that the direction of historical progression favors China's rise. Nonetheless, recent events, including trade disputes, South China Sea problem, the ongoing issue of Taiwan, and heightened restrictions on technology exports under the administrations of former U.S. President Donald Trump and current President Joe Biden, particularly in the sphere of emerging technologies, have elevated China's threat perception.

These factors have led to a narrative of containment against China, as discussed in the previous section (Callahan, 2016). When the Chinese stance (both in terms of threat perception and perception of opportunities) is compared to before the 2000s it is plausible to argue that China is no longer a country

that faces the Soviet Union threat and far more developed than it was both economically and technologically. This argument holds value both for the People's Liberation Army's advancements in emerging technologies and Chinese technology footprints in the world, particularly 'third world countries' (Kania, 2019)[14]. According to a dataset provided by the Australian Strategic Policy Institute (2023), 27 Chinese technology companies have a presence in 186 different countries, offering cost-effective equipment, data centers, and various technologies like smart city projects and 5G. These companies present viable alternatives in regions typically neglected by Western companies, even reaching into rural parts of the United States such as Montana (Hillman, 2021). Hence, when considering the system clarity prior to 2001, it is plausible to assert that China, in spite of experiencing stringent restrictions, especially in the semiconductor industry viewed as a major threat by the CCP leadership, holds ample opportunities for technological growth and collaboration with less developed countries.

To wrap up, systemic clarity was a key (systemic) variable for China's technology development as its strategic environment since the foundation of People's Republic of China in 1949. By aligning with the communist bloc, China was instantly enmeshed in the Cold War dynamics. Its participation in the Korean War, along with the unresolved Taiwan issue, intensified China's threat perception to a high level. For Mao Zedong, China's position in the communist bloc inevitably meant continuous confrontations with various threats. The Sino-Soviet split, which began in the 1960s following Joseph Stalin's death, only heightened this perception as the Soviet Union ceased to be an ally. Nevertheless, this period also presented opportunities to the CCP leadership. Many of Mao Zedong's domestic policy decisions were influenced by considerations of external threats such as foreign powers, infiltrators, imperialism, capitalism, and many more. While US President Richard Nixon's visit to China helped alleviate tensions between the two nations and offered alternatives to Soviet technology, it would be an oversimplification to claim a dramatic shift in the CCP leadership's threat perception during that period.

Under Deng Xiaoping's leadership, China's opening up to foreign investment and the implementation of sweeping reforms marked a turning point for the country's technology development efforts. During this period, China began learning from various countries, absorbing scientific and technological knowledge.

[14] In 2017, Xi Jinping established a timeline for the People's Liberation Army (PLA) with specific milestones: achieving mechanization by 2020, essentially completing modernization by 2035, and becoming a world-class army by 2049. For further details, refer to Campbell (2021).

While it would be a stretch to say that China was fully capitalizing on Western scientific and technological resources at this point, it is accurate to describe this era as a formative period for Chinese scientists and CCP leadership, allowing them to stay abreast with technological advancements. The era commencing in 2001 can be characterized by opportunities outweighing threats for China. This assertion stems from several factors. Firstly, while the Western world, particularly the US, was primarily occupied with enduring 'war on terror' efforts, China was actively engaging with the global economy and continuing its learning trajectory from Western companies. Secondly, China's increasing global engagement presented more avenues to promote the country, particularly through significant events such as the Summer Olympics. This marked a new era for China from the perspective of CCP leadership. Thirdly, the global financial crisis of 2008 boosted China's global presence and affirmed their historical materialist worldview, a perspective that became more pronounced under Xi Jinping's leadership. Following Xi Jinping's rise to power in 2012, China's technological development, especially in emerging technologies, accelerated with distinctly 'Chinese characteristics'. Concurrently, Chinese tech companies broadened their reach, disseminating their technologies in an increasing number of countries. In this period, despite the lessened intensity of China's threat perception compared to pre-2000s decades, the preservation of security and the vanguard status of the Communist Party remained paramount in the CCP's strategy, a point I will delve into further in subsequent chapters. The election of US President Donald Trump and the successive confrontational policies from both his and President Biden's administrations have once again escalated China's threat perception. These eras have seen a marked increase in reactive strategies in response to what CCP officials have branded as 'anti-China' policies. However, as the world's second-largest economy, China's interpretation of systemic clarity is chiefly guided by historical materialism, as explored throughout this chapter. In the 20th National Congress of the Communist Party of China, which took place in October 2022, Xi Jinping's report to the Congress encapsulated both the opportunities and threats that China faced, and provided insights into how the CCP leadership perceives the international system. As the document asserts (Embassy of the People's Republic of China in Malaysia, 2022, para. 92):

"Building a modern socialist country in all respects is a great and arduous endeavor. Our future is bright, but we still have a long way to go. At present, momentous changes of a like not seen in a century are accelerating across the world. A new round of scientific and technological revolution and industrial transformation is well under way, and a significant shift is taking place in the international balance of power, presenting China with new strategic opportunities in pursuing development. At the same time, however, the once-in-a-century pandemic has had far-reaching effects; a backlash against

globalization is rising; and unilateralism and protectionism are mounting. The global economic recovery is sluggish, regional conflicts and disturbances are frequent, and global issues are becoming more acute. The world has entered a new period of turbulence and change"

Systemic Clarity

PERIODS	THREATS	OPPORTUNITIES	TIMELINE
1949-1972	High	Low (Domestic)	As long as China Stays in Communist Bloc
1972-1978	High	Medium	N/A (Interregnum)
1978-2001	Medium	High	Reform and Opening up
2001-2008	Low	High	N/A
2008-2016	Low	High	Decline of West
2016-2023	Medium	Medium	Decline of West

Figure 8. Systemic clarity (Source: Author's compilation)

5.2 Techno-nationalism as a domestic intervening variable

Within the context of neoclassical state action theory and the theoretical underpinnings of this thesis, the argument is made that techno-nationalism has been a fundamental domestic intervening variable in China's growth in the fields of AI and science and technology in a broader sense. This is not to say that other domestic variables have not had an influence on the practical and theoretical aspects of China's AI policy - variables such as strategic culture, state-corporate relationships, corporate culture, and the perceptions of CCP leadership, among others, certainly have. However, the scope of this thesis is

purposefully limited to the domestic variable of techno-nationalism within the context of Chinese AI development.

To put it plainly, this thesis characterizes techno-nationalism as an approach where state and corporate actors, either collectively or independently, devise and enforce policies aimed at fostering domestic technologies to protect the local market and brands. This does not imply that tech companies are restricted from expanding globally or operating in international markets. Rather, it suggests that states might proactively implement protectionist policies by backing local companies while creating barriers for foreign entities not to compete in the domestic market (MacIsaac and Duclos, 2020). Techno-nationalism can also be defined as a policy framework that intertwines geopolitical, economic, national security, and ideological considerations of states (Luo, 2022).

Techno-nationalism is neither a new phenomenon nor is it only indigenous to Chinese science technology development[15]. For instance, until the 1960s the majority of newly industrialized Asian economies (particularly Japan) was under the influence of techno-nationalism which their policies started to change with easing the Cold War atmosphere towards techno-globalism (Nakayama, 2012). Indeed, the underlying rationale for states has traditionally been to safeguard their domestic markets while striving for competitiveness in global markets. However, today, states—irrespective of their governance models, be it proper democracy or not—are more actively involved in the technology realm. This is particularly true in light of the complex status of big tech companies, the emergence of national security concerns, and the unpredictability of emerging technologies' impact (Agarwal et al., 2020; Hare, 2016). Consider, for example, the recent congressional hearings involving Facebook's top brass, including founder Mark Zuckerberg, in the wake of the Cambridge Analytica scandal. The US government intervened directly in this case, motivated primarily by data privacy and national security concerns. Furthermore, it is essential to acknowledge the broader implications of techno-nationalism in the context of both the United States and China. In the US, the preservation of the dollar's global dominance has led to a protectionist stance particularly given China's economic rise, notably visible in the scrutiny and pushback against Facebook's proposed digital currency, Libra (Aranguez-Diaz; 2020; Milner, 2021). This desire to safeguard national financial sovereignty reflects the extent of techno-nationalistic practices in response to disruptive technologies.

[15]Similar practices can be traced back in economic history, particularly during periods when states prioritized mercantilism, thereby tying technological and economic innovations to national security and foreign relations.

Conversely, in China, techno-nationalism is embodied in the CCP's direct intervention in the technology market. Through imposing stringent regulations, the CCP strives to maintain control over major technology companies and to prevent monopolistic behaviors. However, the efficacy of these measures remains a point of debate. While some argue that the CCP has been successful in managing these monopolies (Freedman, 2021; Interesse, 2023), others assert that the CCP favors monopolies it can effectively control.

This complex interplay between techno-nationalism, state regulation, and corporate behavior is not confined to the realm of international relations. The domestic implications are significant and often result in intricate challenges as states and big tech companies negotiate power dynamics. Thus, techno-nationalism is not merely a construct of geopolitical maneuvering but a critical domestic intervening variable in the evolving landscape of artificial intelligence and science and technology development.

The unpredictability of the potential consequences of emerging technologies also compels states, particularly the US, to take preemptive measures. These can include increased funding for public-private partnerships, the creation of alliances with partner countries, avoidance of the Chinese technology ecosystem, and regulation of the domestic market through antitrust and monopoly laws (Capri, 2020). Indeed, these practices fundamentally align with the principles of techno-nationalism, accelerating both the tech race between the US and China and promoting protectionism in the global technology domain. Additionally, such measures contribute to a growing fragmentation of global technology markets, chiefly along bipolar lines delineating the Chinese and Western technology ecosystems. Yet, it is crucial to note that despite this emerging divide, the actors within these ecosystems remain heavily interdependent particularly in the context of AI development. Such global fragmentation introduces complexities in technology transfer, intellectual property rights, data privacy norms, and cybersecurity protocols. This geopolitics-driven techno-nationalism further reveals the criticality of developing local technologies and achieving self-sufficiency in key technology domains. This is particularly observable in China's approach to technology development, where techno-nationalism has played a pivotal role in shaping the country's science and technology trajectory. There are three central reasons why the CCP leadership has deployed techno-nationalist practices.

Firstly, techno-nationalism was seen as a mechanism to transform China's economy into one that is not only capable of competing in the global market, but also capable of avoiding the middle-income trap. This process was initiated during Hu Jintao's tenure and further accelerated under Xi Jinping's leadership (Evans, 2020). Secondly, techno-nationalism facilitated significant growth for Chinese tech

companies, both domestically and internationally. Within China, the government implemented specific laws and regulations to curtail the presence of foreign, especially technology, companies, even while maintaining an image of an open market with unique Chinese characteristics. These regulations didn't necessarily target foreign companies directly; instead, they often took the form of anti-espionage laws and data localization measures, ostensibly enacted for national security reasons. These aspects will be further discussed in subsequent chapters (Yeh, 2023). On the global stage, Chinese companies have consistently been supported by the CCP leadership through substantial funding and public tenders, both domestically and internationally. This is achieved by actively advocating technology diplomacy under the supposition that these firms represent not just themselves, but China as a nation, thus expanding their digital footprint (Cramer-Flood & Boland, 2022; Drinhausen & Lee, 2021; Wagner & Simon, 2022)[16]. Finally, the CCP's techno-nationalist policies have facilitated China's drive towards self-reliance, particularly during Xi Jinping's tenure. Comprehensive strategies such as Made in China 2025 have been instrumental in accelerating this process. Evans (2020) refers to this as the 'de-Americanization' of the Chinese tech ecosystem. However, the extent to which the CCP can achieve self-reliance remains a topic of debate given the mutual dependencies between China and the US, particularly in AI-related resources like semiconductors and raw materials.

Examining modern Chinese history, one can observe the profound influence of Chinese nationalism across nearly all eras, regardless of the shifting ideologies (republicanism and communism) and worldviews adopted following the fall of the Qing dynasty in 1912 (Larsen, 2011). As Townsend argues (1996, p.38) :

"a 'rising tide' of nationalism is a constant factor, perhaps the only one, in China's long revolutionary era. As the metaphor suggests, the waters of nationalism steadily engulf all that stand in their path — imperial, Republican, and Communist institutions, elite and popular classes, coastal and interior regions, reformist and conservative factions, Chinese at home and abroad. Other movements and ideologies wax and wane, but nationalism permeates them all".

Chinese nationalism first manifested in 1919 as a search for self-identity, embodied in the demands for "Mr. Science" and "Mr. Democracy" during the May 4th Movement as I discussed in the previous chapter. In subsequent periods, it continued to be a recurring reminder of the 'century of humiliation,' a period that began with the First Opium War in 1839. Indeed, when examining Chinese nationalism from

[16]For instance, a study by Wagner and Simon (2022) notes that the Chinese Ministry of Science and Technology established connections in 161 countries and regions. However, it is challenging to meticulously map out each of these agreements due to the scarcity of data.

an International Relations perspective, various scholars have offered distinct views. Ying-shih Yu contends that the rise of Chinese nationalism during the 1990s was a reflection of the CCP's aspiration to replace the dominant position of Western states in the global system. Conversely, Samuel Huntington posits that it is a manifestation of China's intent to overcome historical subjugation, deeply rooted in the 'Century of Humiliation' (Zhao, 2000).

While it might be tempting to classify the People's Republic of China as a purely communist state due to the revolutionary surge of the 1940s, one could convincingly argue that Mao Zedong's political philosophy placed Chinese identity above all else. This perspective is evident in his writings. For instance, in his essay *The Great Union of the People*, published in the XiangJiang Review, he highlights this point (Zheng, 2019, p.12):

"Our Chinese nation originally had great ability... the reform of the Chinese nation someday will be more thorough than that of any other nation. The society of the Chinese nation will be brighter than any other nation. The great unity of the Chinese nation will precede that of any other nation in any other region"

In his work, Modongal (2016) characterizes Chinese nationalism during Mao's tenure as a form of state-centric nationalism. Key historical developments, such as the Korean War against the US and the Sino-Soviet split, played a significant role in consolidating Chinese identity (Garver, 1988). Deng Xiaoping's era, on the other hand, initially espoused a more liberal-oriented nationalism until the Tiananmen Square incident, after which nationalism took on a more aggressive form. In subsequent leadership tenures, this evolved into a patriotism-centric approach (Whiting, 1995). During the early stages of Deng Xiaoping's era, a liberal-oriented approach was necessary as China had just begun to engage with the global economy. However, the Tiananmen Square protests starkly illuminated the inherent limits to this liberal orientation, largely due to concerns over regime security. Consequently, nationalism once again became a useful vehicle to mobilize the masses against perceived foreign threats and subversive influences (Hughes, 2014).

A closer look into the scholarly debates of the post-Tiananmen era, particularly within Chinese literature, reveals two dominant themes that elucidate both the essence of the patriotic approach and the rationale for the increasing gravitation towards techno-nationalism in the succeeding decades. These themes center around the notions of self-reliance and a measured posture towards foreign nations.

For instance, an article that was published in the official magazine of the CCP in 1989, People's Daily (Pinyin: Renmin Ribao), encapsulates the foundational motivations behind Chinese nationalism. The

piece states, “For a country to shake off foreign enslavement and become independent and self-reliant is the premise for its development.... Although China was a large country prior to liberation, it was pathetically reliant on others, leaving it susceptible to their bullying” (Whiting, 1995, p.297). The crux of this narrative, as it relates to the analytical framework of the current thesis, is that as China expanded economically and gained experience in manufacturing technological products, the concepts of nationalism and technology development became increasingly intertwined.

In 2012, Xi Jinping articulated this vision, stating, "The tomorrow of the Chinese nation may be described as 'the opportune time when the heavy breeze breaks the waves'" (Kallio, 2015, p. 527). Indeed, while techno-nationalism is evaluated in this thesis as a domestic intervening variable, it is important to note that it does not exist in isolation from China's systemic clarity and strategic environment. How China interprets international developments and the extent of permissiveness in its strategic environment contribute to its economic progress and technological advancement. This connection underlines the integrated nature of the variables under study: techno-nationalism is not merely a reflection of domestic policy but also an outcome of China's interaction with the global system. Therefore, it is reasonable to assert that Chinese nationalism has assumed various forms throughout the modern history of China. In the context of AI development and overall scientific and technological advancement, concepts such as self-reliance and benchmarking China's progress against Western countries (as competitors) remain pertinent. This is evidenced, for instance, in an excerpt from an official document published by the State Council, titled Notice on the Made in China 2025 (The State Council of the People’s Republic of China, 2022a, p.2):

“Building an internationally competitive manufacturing industry is the only way China can enhance its comprehensive national strength, ensure national security, and build itself into a world power...A complete, independent, and whole industrial system has been built, which has firmly promoted the process of industrialization and modernization, significantly enhanced comprehensive national strength, and supported China's status as a great power (大国) in the world. However, China's manufacturing industry is still large but not strong compared with globally advanced levels, with significant gaps in independent innovation (自主创新) capabilities, resource utilization efficiency, industrial structure level, degree of informatization, and quality and efficiency”

Indeed, one could argue the significance of the concept of socialism with Chinese characteristics in the context of Chinese scientific and technological advancement. In other words, it could be asserted that official documents under investigation often underscore the success of the socialist model,

accompanied by recurring invocations of ideologies such as Mao Zedong Thought or Xi Jinping Thought on Socialism with Chinese Characteristics. While this line of reasoning may hold some validity, the global representation of emerging technologies is not intrinsically linked to socialism. Instead, these are recognized as Chinese achievements, leading us to the conclusion that Chinese AI development is inextricably linked to the Chinese identity and national power (Scharre, 2023). Consider, for instance, the pronouncedly nationalistic opening of Xi Jinping's report presented at the 19th National Congress in 2017 (Xinhua, 2017, p.1):

"Never forget why you started, and you can accomplish your mission. The original aspiration and the mission of Chinese Communists is to seek happiness for the Chinese people and rejuvenation for the Chinese nation. This original aspiration, this mission is what inspires Chinese Communists to advance".

Indeed, the nationalistic viewpoint prominent in Xi Jinping's congressional report, suffuses almost every aspect of the CCP's comprehensive technology policies. This symbiosis essentially anchors technology development to China's future, advancing the narrative of techno-nationalism. By way of illustration in the guiding ideology section New Generation Artificial Intelligence Development Plan (NGAIDP) states (Webster et al., 2017, para.10):

"Comprehensively enhance society's productive forces, comprehensive national power, and national competitiveness, in order to provide strong support to accelerate the construction of an innovative new-type nation and global science and technology power, to achieve the two centennial goals and the great rejuvenation of the Chinese nation"

The nationalistic technology strategies, characterized as techno-nationalism in the present thesis, play pivotal roles in the mobilization and extraction of resources. For instance, as will be detailed in subsequent sections, the CCP establishes guidelines, sets comprehensive objectives, and delineates benchmarks (aligned with global standards) concerning national AI development. It also designates significant responsibilities to big tech companies, functioning as national champions, to stimulate further mobilization.

Nearly all official guidelines examined in the current thesis assign substantial significance to emerging technologies, particularly AI, and underscore the role of these technologies as primary instruments of national power and security, which I will elaborate on in the following sections. As such, it is reasonable to conclude that techno-nationalism is a pivotal domestic intervening factor in domestic AI development, affecting virtually all AI sub-domains, be it semiconductors or data sovereignty. This is achieved by supporting domestic big tech companies both nationally and globally through research and development fundings, tech diplomacy and public procurements, while concurrently limiting through high entry

standards and regulations, to a certain extent, the presence of foreign tech companies in the Chinese market. These practices are echoed in the report of the US-China Economic and Security Review Commission as (Koleski and Salidjanova, 2018, p.2):

"Through its Catalogue on Guiding Foreign Investment and Catalogue on Encouraged Imported Technology and Products, the Chinese government directs foreign investment and technology imports toward strategic sectors by designating industries as either "encouraged," "permitted," or "restricted" to foreign investment. Foreign investment in targeted sectors is first welcomed to build domestic capacity, but after domestic firms become competitive, the government gradually restricts this investment to provide a protected market for domestic firms. For example, the automobile industry shifted from "encouraged" in 1994–2010 to "permitted" in 2011–2014 to "restricted" in 2015"

However, it is important to clarify that the restriction on foreign technology companies does not imply they are entirely barred from operating in China. Rather, it indicates the existence of a somewhat constrictive market within which foreign companies may operate, particularly following the enactment of the anti-espionage law, as previously mentioned.

5.3. Domestic and external mobilization and extraction of resources in AI context

5.3.1 Domestic mobilization and extraction policy in China

5.3.1.1. Historical foundations of resource mobilization and extraction

Throughout the modern history of China (1949-2023), the CCP has demonstrated an adeptness in resource mobilization, a competency that is inextricably intertwined with its ideological underpinnings rooted in Marxism and Leninism. The latter, in particular, posits the role of the party as more than a simple organization with accessible membership; instead, it is construed as a leading force that governs societal dynamics. This perspective begets the concept of the 'vanguard party', a system predicated heavily upon the principle of democratic centralism. The latter encapsulates a scenario wherein party members are granted the liberty to voice their perspectives, but the moment a decision is ratified, all members are obliged to enforce the determined policy without hesitation (Mc Adams, 2018). In essence, the vanguard nature of the party bestows substantial authority upon its leading figures (most notably the chairman), empowering them to act in the name of the proletariat. It is, however, crucial to

acknowledge that such designated policies may not always align with the broader population's best interests. The vanguard function of the party is also tied intricately to the Leninist conceptualization of populism, which asserts the party's role as the representative of common people's interests against the so-called 'corrupt' elite (Meisner, 1971). This particular theoretical perspective, referred to as Leninist Populism, essentially forms the foundational bedrock upon which the necessity for resource mobilization is predicated. This is done with the objective of transforming prevailing circumstances conducive for the successful instigation of a communist revolution. Joseph describes this as "The Leninist theory of revolution is based on the assumption that the masses cannot lead the revolution on their own but must be mobilized and directed by a vanguard communist party" (2019, p.168).

The CCP was established in July 1921 as a vanguard party, grounded in the tenets of Marxist-Leninist ideology (Mitter, 2020). However, it soon became apparent that a strict adherence to Marxist-Leninist principles was not fully applicable to the unique context of the CCP. Consequently, the teachings and philosophies of Mao Zedong were incorporated into the CCP's official ideology, yielding a variant of communism imbued with Chinese specificities, often referred to as Mao Zedong Thought.

Interestingly, Mao Zedong Thought embodied the pragmatic aspects of communist theory, while Marxism-Leninism encapsulated its more ideological dimensions. This confluence of theory and praxis offered a more robust framework for the CCP's ideological underpinnings and strategic actions (Dirlik, 2005; Schurmann, 1966). The socio-political conditions in China between 1921 and 1949 were notably different from those during the Bolshevik Revolutionary War. Key party leaders, especially Mao Zedong, posited that if a communist revolution were to occur in China, it would likely stem from the mobilization of the peasantry, diverging from the Bolshevik revolution's labor-centric approach. This deviation is reflective of the adaptable nature of Mao Zedong Thought, which consequently led to ideological tensions between Joseph Stalin and Mao Zedong.

Upon the establishment of the People's Republic of China in 1949, the CCP embarked on a series of radical policy measures. These encompassed efforts to consolidate the nation by eradicating warlords, implementing land reform through the seizure of fertile land from landowners, and instigating broad socialist reforms across virtually all sectors of political and social life (Fenby, 2008). This transformation, theoretically, was principally centered on the direct mobilization of resources, encompassing actors, funds, lands, and existing institutions, to expedite the socialist revolution and ultimately transition towards communism. For instance, regarding the comprehensive land reform Teiwes argues that (2019, p.83):

"Now class struggle and mass mobilization were emphasized, with poor peasants assuming village leadership and landlords humiliated, with perhaps one to two million alleged exploiters executed. A substantial redistribution of land to poor and middle (more productive but not rich) peasants occurred, but the most significant outcome of land reform was the destruction of the old rural power structure"

In the subsequent decades, we witness the direct mobilization of resources as evidenced in the Great Leap Forward, initiated by Mao Zedong from 1958 to 1962. The objective was to metamorphose China from an underdeveloped nation to a leading industrial and agricultural powerhouse, focusing primarily on steel and grain production (Lovell, 2019). However, the ground reality revealed a severe human cost, with millions of lives lost as a consequence of the Great Leap Forward. While Mao was spearheading this mass domestic mobilization, he was concurrently engaged in external extraction activities (by transferring Soviet Union technology and expertise) and seeking external validation at the international level. This pursuit for external validation was prominently displayed in China's support for other communist regimes, primarily in the South East Asia region, through the provision of military training, propaganda tools, funds, and infrastructure development (Garver, 2015).

Additionally, Mao Zedong's classification of global powers into three spheres, known as the 'Three Worlds Theory,' formed an integral part of China's external validation strategy. Mao Zedong articulated his viewpoint as follows: "In my view, the United States and the Soviet Union belong to the first world. The in-between Japan, Europe and Canada belong to the second world. The third world is very populous. Except Japan, Asia belongs to the third world. So does the whole of Africa and Latin America" (Ministry of the Foreign Affairs of the People's Republic of China, 2014, para.4). The adoption of the 'Three Worlds Theory' signified the CCP's aspiration to establish itself as a formidable power on the global stage, particularly in juxtaposition to the Soviet Union. Simultaneously, this approach served as a strategic mechanism to galvanize international support concerning the contentious issue of Taiwan. Thus, it embodied a dual-purpose strategy that simultaneously facilitated the assertion of global dominance and the pursuit of resolution for domestic geopolitical challenges.

The Cultural Revolution (1966-1976) is a salient example of Mao Zedong's substantial mobilization efforts of radical party members, a population and university students (red guards) that aimed at both quelling opposition and purging China of its alleged bourgeois culture and traditions. This tumultuous period led to an immense depletion of social capital (Dikkoter, 2016). Following the conclusion of the Great Leap Forward in 1962, the CCP embarked on a comprehensive campaign of indoctrination. As Teiwes eloquently articulates (2019, p.98): "The major mass mobilization movement of the period, the rural Socialist Education Movement of 1962-1966, which was aimed at ideologically reinvigorating

village cadres and combating corruption and other backward phenomena, was not implemented universally but instead reached only about one- third of China's villages". This comprehensive rectification movement or ideological indoctrination campaign was essentially a manifestation of a twofold necessity. Firstly, it aimed to suppress the so-called 'radical voices' that were beginning to question Mao's leadership, predominantly as a result of the failures encountered during the Great Leap Forward. Secondly, it sought to amplify Mao's image, thus ensuring the continued discipline and adherence among CCP cadres to the party's directives (Khan, 2022; Lam, 2018).

In the aftermath of Mao Zedong's death in 1976, China underwent a paradigm shift in its political system, domestic economy, and foreign relations. However, the intrinsic capability of the CCP to mobilize and extract resources remained largely unaltered. For instance, in her study, White (1990) suggested that the postrevolutionary Chinese political paradigm continuously witnessed the utilization of diverse mobilization strategies. These were chiefly employed as the Deng administration endeavored to swiftly and radically restructure the institutional mechanisms and habitual practices emblematic of Maoist China, all while maintaining the underpinnings of a Leninist political system. This continuity of mobilization was also discernible during the period of China's transition towards global integration, commonly referred to as the 'Opening Up and Reform' (*gaige kaifang*) era that unfolded in the 1980s.

Deng Xiaoping, the then paramount leader of the CCP, delivered a seminal speech in 1980, hinting at profound shifts in the political landscape. He critiqued bureaucracy, excessive concentration of power, lifetime tenure in pivotal party positions, and any form of privileges (Gilley, 2019). In order to stay abreast of the global transformations occurring in both economic and political arenas, China needed to undertake expansive projects necessitating extensive mobilization and extraction of resources, with the aim of effecting a significant economic transformation (Vogel, 2011). In a notable speech delivered in 1985, Deng Xiaoping underscored the imperative of mobilizing and extracting resources to foster the integration of science and technology with the productive sector of the population. He explicitly highlighted: "The Central Committee of the Party has called for the work in science and technology to be geared to the needs of economic development" (Laine, 2023, para.4).

Contrary to expectations, the mobilization initiative under Deng Xiaoping's leadership did not initially target the economy; instead, it primarily focused on the party cadres. Deng introduced an accelerated program that facilitated the ascension of educated party members to the upper ranks of the party hierarchy - a scheme that later benefited his successors Jiang Zemin, Hu Jintao, and Xi Jinping (Gilley, 2019). This call to action signified the pressing need for skilled individuals to drive the economic and political reforms of the era, a phenomenon later labeled as the 'technocratic turnover'. Based on

estimates, in 1981, farmers and workers constituted 63.9% of the CCP membership, and a mere 4% of members had received education beyond high school. However, by 2017, this landscape had transformed remarkably, with college graduates comprising 48.3% of the party membership (Li, 2019). This shift underscored the strategic transition toward a more technologically proficient and educated cadre within the CCP.

In the realm of domestic economy, the establishment of township and village enterprises - rural factories managed by local governments - constituted a significant part of the initial phase of the 'Opening Up and Reform' period. Concurrently, the de-collectivization of agriculture (a direct mobilization strategy) and the invitation to foreign ventures (an external extraction strategy) were initiated to rejuvenate the economy. Perhaps the most consequential decision to mobilize and extract resources was the establishment of Special Economic Zones (SEZs) in cities such as Shenzhen, Zhuhai, Shantou, Xiamen, Hainan, Shanghai, and Tianjin. These zones allowed various actors to engage in a plethora of economic activities (Yeung et al., 2009). In 1980, China announced its first comprehensive foreign talent acquisition program, titled 'Regulation for Trial Implementation of the Work on Foreign Cultural and Educational Experts', albeit initially only allowing foreigners to work in China via official invitation. This could be viewed as a strategy of external extraction (Xu, 2023). To those closely observing China during this period, such a move was unsurprising, given Deng Xiaoping's emphasis in his speech (Laine, 2023, para.6):

"First, every year we must solve some of the intellectuals' problems, producing practical results. Second, we must create an environment that enables the brightest people to come to the fore. That is precisely the objective of our reform. We have no lack of talented people. We should not stifle their talents merely because they don't know everything yet or are not Party members, or because they don't have much education or a long record of service. The ability to identify capable people, unite with them and put their talents to best use is one of the chief signs of an experienced leader"

Contrary to the prevailing scholarly expectations of the time, these extensive efforts of mobilization and resource extraction by the CCP were not intended to foster democratization within China. The predominant assumption was that as China became more deeply integrated into the global economy and opened its industries to foreign investment, it would inevitably transition into a modern democracy, much like Japan did post World War II (Mitter and Johnson, 2021; Pei, 2021). The advent and proliferation of information technologies, particularly the Internet, spurred evaluations that led Western academics and political figures to formulate misguided forecasts about China's prospective democratic future. One salient example of this can be found in former US President Bill Clinton's address on the

China Trade bill, where he posited that, "In the new century, liberty will spread by cell phone and cable modem...imagine how much it could change China" (Hillman, 2021, p.8). Contrary to these predictions, the envisaged transformation did not unfold as expected, an outcome that was significantly influenced by the events beginning in 1989, most notably the Tiananmen Square protests. The common misconstruction among scholars, with regard to the intricate relationship between a (state-led) free-market economy and democracy, lay in their insufficient consideration of the CCP's vanguard role. Admittedly, Deng Xiaoping's strategic doctrine prescribed that China should hide its strength and bide its time before assuming a leading role on the global stage, a stance advocating a low profile while essential economic, military, and technological reforms were underway (Keith, 2017).

Deng Xiaoping was famously pragmatic in his approach, declaring that it did not matter whether the cat was black or white, as long as it could catch mice (a reference to his willingness to embrace market-based liberal economic policies regardless of their ideological color) (Baum, 1996; Naughton, 1993). Nevertheless, it is critical to comprehend that for the CCP, economic liberalization did not equate to the democratization of the country. For the party, its own survival and strength were paramount, as it formed the cornerstone that kept all socio-political pillars robust in China (Dickson, 2016; Pearson et al., 2021). Throughout the tenures of Jiang Zemin and Hu Jintao, China continued to advance economically and technologically. However, neither leader commanded the authority enjoyed by Chairman Mao or paramount leader Deng Xiaoping, largely due to the increasingly fragmented nature of the political elite, which proved challenging to govern (Gilley, 1998; Lam, 2016). Concurrently, China found itself in a period of profound economic transformation. The reverberations of events such as the Tiananmen Square incident, coupled with various other disturbances including the Falun Gong movement and widespread corruption, underscored the vulnerability of the nation (Kwong, 2015; Penny, 2012; Wederman, 2004). These circumstances revealed that both leaders were compelled to maintain the international image of China as a resilient power, undeterred by these internal upheavals.

The dynamic significantly shifted with the onset of Xi Jinping's leadership in 2012. Distinct from his immediate predecessors, Hu Jintao and Jiang Zemin, Xi Jinping adopted a more forthright approach towards the political elite, particularly concerning party discipline, thereby unequivocally asserting his control. Upon his election, Xi explicitly "emphasized the importance of unified top leadership, a loyal military, and full embrace of Marxism-Leninism, including important aspects of Mao Zedong Thought, if the CCP were to survive attempts to undermine party rule." Furthermore, he noted, "The Soviet Union's communist party had proportionally more members than us, but when it was threatened, nobody was man enough to stand up and resist" (Gilley, 2019, p.146). These speeches were interpreted by CCP

members as harbingers of impending turbulence and the birth of a strongman akin to chairman Mao Zedong.

At the outset of his leadership, Xi Jinping initiated an extensive campaign to combat the endemic corruption within the Chinese government. Some scholars suggest that this may have been a strategic move to eliminate potential adversaries, including figures such as Bo Xilai, utilizing the Central Commission for Discipline Inspection as a tool in this endeavor. In parallel, Xi Jinping introduced ambitious visions like the "Chinese Dream," with the goal of propelling China into a preeminent position on the global stage (Wang and Zeng, 2016; Wang, 2014). The 20th party congress of the CCP, held in 2022, marked a milestone in Xi Jinping's rule. President Xi managed to secure an indefinite term in office, diverging from the constitutional term limits of his predecessors. This transition, while a significant departure from prior convention, did not come as a shock to scholars and China watchers, given that Xi Jinping had demonstrated a firm hold on power since the inception of his tenure (The State Council of the People's Republic of China, 2022). In the 20th party congress Xi Jinping also replaced officials from his predecessor in the politburo and standing committee with the royal individuals (Bush et al., 2022). Although, as previously mentioned, Xi Jinping has consistently held a powerful position within the CCP, it is crucial to emphasize the importance of this strong leadership in the context of the thesis's main arguments. According to state action theory, a centralized authority endows a nation with the capacity to mobilize resources swiftly, compared to its democratic counterparts.

5.3.1.2 Domestic mobilization

The articulation of China's long-term objectives for AI development was substantiated in 2017 with the proclamation of the NGAIDP. However, the foundational groundwork underscoring the crucial role of science and technology can be traced back to the 1980s. This period was characterized by Deng Xiaoping's reformist policies that opened China up to international influence, aided in part by the contributions of esteemed scientists such as Qian Xuesen and Wu Wenjun (Cai, 2016). Arguably, the National High-Tech Research and Development Program, colloquially known as the 863 Program, initiated in 1986, is considered a forerunner in shaping China's long-term technological trajectory. The impact of this program remains discernible, primarily due to its integration within successive Five-Year Plans (Consulate General of the People's Republic of China in New York, 2016). Nevertheless, it is imperative to acknowledge that the intensity of AI research during these initial stages was relatively subdued, attributed in part to technological and theoretical constraints. Moreover, early advancements

in Chinese AI development may not have paralleled those of Western counterparts due to China's comparatively less industrialized capabilities (Xiong, 2021).

While the commencement of AI research in China during the 1980s marks a significant milestone, it should not be misconstrued to imply a lack of emphasis on science and technology in the preceding years though most of the Chinese technology relied heavily on the Soviet Union (Bernstein, 2010; Can and Vieira, 2022; Jersild, 2014). For instance, during the Chairman Mao Zedong period 'Two bombs and One satellite' (Pinyin: Liangdan Yixin) project was seen as a first step to reach technological breakthroughs that both guaranteed Chinese national security and infrastructure development (Liu, 2019). Therefore, science and technology development in China should not be viewed merely as an ambitious objective; it transcends this, serving as an ideological instrument deeply rooted in Marxist-Leninist thought. This concept is encapsulated in the term *ganchao* (catch up and surpass), a thread running from the era of Mao Zedong to that of Xi Jinping. Notably, each period exhibits its distinct policies, replete with narratives of both successes and failures (Gewirtz, 2019).

As Artificial Intelligence regained prominence in the 2000s, the State Council of the CCP published its National Medium- and Long-Term Plan for Science and Technology Development (2006-2020), in which AI was incorporated as a strategic emerging technology (Cao et al., 2006). In the policy document, the Chinese Ministry of Science and Technology (MoST) outlined the following priority areas:(2013, p.1-2):

"Strategic industries that are closely linked to tech industry development and traditional industry upgrading, resolve bottlenecks on economic development, improve public health, and safeguard national security. These projects will be launched upon further review and approval on a case-by-case basis, in light of the nation's needs and the readiness for implementation. Meanwhile, these projects will be adjusted dynamically along with the nation's evolving strategic needs and circumstances, and will be implemented in a well-paced manner. For the projects aiming to develop strategic products, enterprises are expected to be the principal player in the R&D and investment. Major equipment is what to start with in enterprises' technological innovation, and a more market-based approach will be adopted in allocating S&T resources. Meanwhile, the investment by the government, which acts as a catalyst for more input from businesses, will be mainly used to develop key technologies."

The release of the National Medium- and Long-Term Plan for Science and Technology Development (2006-2020) indeed represented the embodiment of four principal motivations underpinning the CCP's pursuit of science and technology advancement. Firstly, the prioritization of national security by the CCP is evident, not only in the series of objectives delineated by Chairman Mao Zedong during the initiation

of the 'Two Bombs, One Satellite' program but also in the continued perception of science and technology as a cornerstone of national security in subsequent years.

Secondly, the CCP has shown a high degree of flexibility in its approach to the development of science and technology. Contrary to what one might expect, the CCP emphasizes the need for policy adaptability in response to evolving national requirements and political agendas. Thirdly, the tenet of self-sufficiency has been underscored as a critical pillar of sustainable science and technology development. This principle may be viewed as foundational to the 'Made in China 2025' initiative, launched in 2015. Finally, despite the CCP's direct governance over the direction of science and technology development, it recognizes the importance of private sector participation in this process, a point that will be elaborated upon later in this discussion.

Before the proclamation of a national AI strategy in 2017, China had launched three significant programs pertaining to AI development and had incorporated AI into its National 13th Five-Year Plan in 2016. As previously mentioned, the first of these initiatives was the 'Made in China 2025' strategy, announced in 2015. This strategy aimed at bolstering domestic manufacturing capacity by incorporating emerging technologies into the manufacturing process, though it did not expressly specify AI development (Yinan, 2015). This marked a significant milestone for China as it set an objective of achieving 70% self-sufficiency in semiconductor manufacturing by 2025—a facet regarded as crucial for AI development (CSET, 2022a). In addition to this, in the same year, Chinese Premier Li Keqiang introduced the 'Internet Plus' initiative, which can be viewed as a complement to the 'Made in China 2025' strategy (The State Council of The People's Republic of China, 2015b; 2015c). Leaders of the CCP outlined four major goals through 'Internet Plus'. As Davidson points out: "China's leaders hope to upgrade and strengthen the security of Internet infrastructure, expand access to the Internet and related technologies, make social services more convenient and effective, and, most importantly, increase both 'quality and effectiveness' of economic development—in other words, move away from labor-intensive manufacturing to a higher point on the value chain" (2015, para.2).

While the initial strategy seemed predominantly focused on manufacturing and did not explicitly tie to AI, the CCP broadened its scope in the subsequent year (2016). They announced the 'Internet +' Artificial Intelligence Three-Year Action and Implementation Plan, a collaborative effort involving the National Development and Reform Commission (NDRC), Ministry of Science and Technology (MoST), Ministry of Industry and Information Technology (MIIT), and the Cyberspace Administration of China (CAC). This plan explicitly incorporated AI development. In the Three-Year Plan, the CCP identified primary objectives to be achieved by 2018, as follows (CSET, 2022b, para. 3):

"By 2018, we will build platforms for AI basic resources and innovation, basically construct an AI industry system, innovation service system, and standardization system, make breakthroughs in the basic core technologies, bring our overall technological and industrial development to international parity, and have some locally leading application- and system-level technologies. We will cultivate several world-leading AI backbone enterprises in key areas, initially build a green and safe AI industry ecosystem with a solid foundation, active innovation, and open collaboration, and form an AI market application scale measured at the 100-billion level"

Indeed, this represented an initial manifestation of the impending comprehensive mobilization effort by the CCP to establish a robust AI ecosystem, incorporating both the private and public sectors. Most significantly, in the 'main tasks' section, the CCP underscored the necessity of having abundant data—encompassing voice, images, videos, maps—and adequate computing hardware to construct a competitive AI infrastructure. As the plan illustrates (CSET 2022b, para.4) :

"We must accelerate the construction of a massive training resource library and a basic resource service public platform for documents, voice, images, videos, maps, and other types of data, build new types of computing clusters that support ultra-large-scale deep learning, and establish and improve industrial public service platforms".

In the same year, 2016, the CCP promulgated its National 13th Five-Year Plan for the Development of Strategic Emerging Industries and the State Council Notice on the Publication of the National Five-Year Plan for Science and Technology Innovation. In the former document, the significance of a variety of emerging technologies was underscored, spanning advanced biotechnology, 3D printing to nanomaterials (CSET, 2019). However, AI and related technologies, such as cloud computing and the Internet of Things, were identified as fundamental to economic prosperity. They were seen as crucial for constructing a 'Digital China' and recognized as "an important symbol of national strength" (CSET, 2019, para. 4). Moreover, the term 'talent' emerges as a recurrent theme in the National 13th Five-Year Plan, as evidenced in the following paragraph (CSET, 2019, para. 10):

"Continue to prosper through talent. Talent is the primary source of development and growth of strategic emerging industries. Accelerate the development of talent growth policies and institutional innovations and ensure that talented people are enumerated based on their knowledge, skills, management, and other innovative factors. Value talented people for their market value and fully stimulate the innovation and vitality of entrepreneurship. Intensify efforts to cultivate and attract all kinds of talented people and promote a spirit of craftsmanship and entrepreneurship" .

Analogous to the National 13th Five-Year Plan for the Development of Strategic Emerging Industries, the State Council's Notice on the Publication of the National 13th Five-Year Plan for Science and Technology Innovation underscores the significance of AI systems for promoting China's innovative spirit. However, it diverges from the previous plan by providing a detailed exposition of the CCP's vision for the future of AI systems, even though some may regard these ambitions as overly optimistic. Notably, it refers to 'big-data driven human-like machine intelligence'—potentially interpreted as a nod towards the concept of Artificial General Intelligence—a goal that might be seen as long-term, given the ongoing debate about when such advanced AI could become reality (CSET, 2020; Goertzel, 2014; Kurzweil, 2014). The year 2016 marks a significant turning point for many scholars, observing China's exploration of potential methods to amalgamate AI with human cognition, an endeavor suggestive of transhumanism. Chinese scientific community typically focused on three distinctive subdisciplines to achieve this integration: 'brain-inspired' AI, which seeks to model human cognitive processes; 'connectomics', a discipline dedicated to mapping the brain with an aim of bridging the gap between humans and AI; and 'neuromorphic' engineering, a field that employs digital-analog chips to blend AI with the human brain (Hannas et al., 2020).

This aspiration to integrate AI with the human brain does not merely hold commercial value for China. Once these experiments and research become feasible, they possess the potential to disrupt conventional paradigms of strategic affairs—encompassing warfare, intelligence statecraft, and psychological operations. This is evidenced by the PLA's categorization of the human brain as a novel domain of warfare, in addition to the traditional domains of air, land, sea, and cyber (Layton, 2021). A report published by RAND Corporation further corroborates Chinese enthusiasm to employ AI-based tools in psychological operations, stating (Beauchamp-Mustafaga, 2023, p.4):"The realization of the PLA's broader vision for artificial intelligence–enabled 'intelligentized warfare' would have immense implications for Chinese psychological warfare".

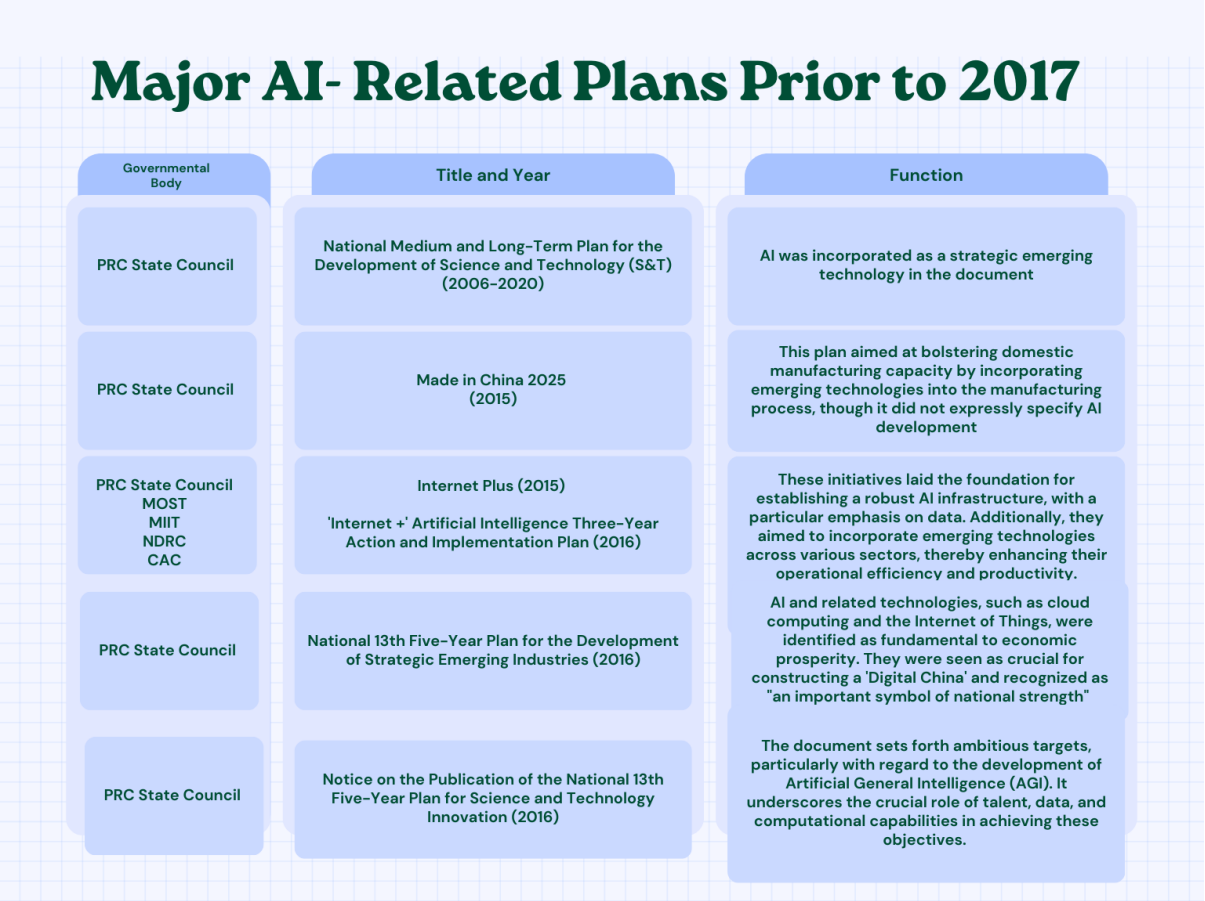


Figure 9. Major AI-related plans prior to 2017 (Source: Author's compilation)

The programs discussed thus far highlight three significant insights. First, even before China declared its national AI strategy, its leadership demonstrated cognizance of the impending technological revolution propelled by emerging technologies. Simultaneously, they recognized China's reliance on foreign technology for the production of domestic technology goods—a realization that perhaps foreshadowed the forthcoming technological contest with the West. This insight prompted the initiation of the 'Made in China 2025' program, which prioritized the fortification of domestic manufacturing capacities. This observation is particularly noteworthy as the majority of scholars concur that China's ascent to a technological powerhouse was not solely predicated on its ability to innovate, but also strongly underpinned by its vast manufacturing capacity and a skilled workforce that could be swiftly mobilized (Li, 2018; Wang, 2023; Xu et al., 2020). Second, the programs investigated thus far underscore the salience of data, hardware, and talent across nearly all aspects, reflecting Chinese leaders' understanding of the fundamental pillars for AI development. Third, the national AI strategy that China unveiled in 2017 cannot be disassociated from these preceding programs, as they effectively laid the groundwork for the national AI strategy. Significantly, regarding strategies for AI development,

numerous local authorities and provinces—including Jiangsu Province, Beijing City, and Liaoning Province—had already publicized 20 AI plans prior to the central government's proclamation of the NGAIDP in 2017. The approach of these local bodies further evolved following the announcement of the NGAIDP, which unequivocally indicates that "they do appear to be a response to the central government's mobilization" (Zeng, 2021b, p.402).

Consequently, the national AI strategy should be perceived as a natural progression of these programs, rather than an isolated initiative. Prior to further discussion, it is essential to underscore the significance of China's national AI strategy as a framework for delineating the AI ecosystem within the country.

5.3.1.2.1 Guiding principles: New Generation Artificial Intelligence Development Plan

The year 2016 marked another turning point for China's AI development. The Chinese Academy of Engineering initiated a consultative research venture named AI 2.0, in the wake of which, attending scientists composed an open letter directed towards the nation's leadership. The intention was to propose an initiative for launching large-scale, high-impact projects. In response to this development, the MoST mobilized a group of 220 AI specialists from diverse sectors, encompassing universities, private corporations, and state institutions, to deliberate on the potential formulation of a national AI strategy (Wu et al., 2020). In 2017, China's State Council, the main administrative authority of the People's Republic of China, unveiled its comprehensive AI development strategy, known as the NGAIDP. The strategic emphasis of the NGAIDP is explicitly articulated in a document that simultaneously discloses China's current ambitions for technological development and the ongoing political contention with major powers, most notably the United States. From the Chinese vantage point, nearly seven decades of AI evolution instigates transformative shifts, not only within the domestic economic sphere—given the myriad of opportunities presented by AI—but also within the realm of international relations, where AI's development poses significant challenges. As strategy puts it (Webster et al., 2017, para.3):

"AI has become a new focus of international competition. AI is a strategic technology that will lead in the future; the world's major developed countries are taking the development of AI as a major strategy to enhance national competitiveness and protect national security; intensifying the introduction of plans and strategies for this core technology, top talent, standards and regulations, etc.; and trying to seize the initiative in the new round of international science and technology competition"

Highlighting international competition elucidates the CCP's perspective on the multifaceted implications of AI. According to the CCP, AI not only instigates international rivalry among actors—especially in areas such as top talent recruitment, infrastructure essential for AI development (including computing resources and data), and the capability to establish standards on both global and domestic fronts—it also uncovers a veiled rationale. This rationale pertains to the CCP's eagerness to vie for resources necessary for the development of robust AI systems. Hence, it became imperative for China to introduce AI-related policies that could ensure not only self-sufficiency but also the development of advanced AI systems. These systems serve a dual purpose: acting as a catalyst for economic growth while simultaneously functioning as a safeguard for national security. According to strategy (Webster et al., 2017 para.3):

"At present, China's situation in national security and international competition is more complex, and [China] must, looking at the world, take the development of AI to the national strategic level with systemic layout, take the initiative in planning, firmly seize the strategic initiative in the new stage of international competition in AI development, to create new competitive advantage, opening up the development of new space, and effectively protecting national security"

However, within the strategy, China simultaneously recognizes that despite its considerable capacity to develop advanced AI systems, "there is still a gap between China's overall level of development of AI relative to that of developed countries—lacking major original results in the basic theory, core algorithms, key equipment, high-end chips, major products and systems, foundational materials, components, software and interfaces, etc." (Webster et al., 2017, para.8). Therefore China needs to "give full play to the role of market mechanisms to mobilize departments, local, business and social forces to promote the implementation of all aspects " of AI development (Webster et al., 2017, para. 116). The strategy identifies three pivotal milestones that China intends to meet in order to establish itself as a global AI superpower by 2030 (Webster et al., 2023). Initially, by 2020, China aims to match global standards in AI system development while capitalizing on AI's economic advantages to facilitate sustainable economic growth. Subsequently, by 2025, the country's goal is to attain significant advancements in foundational AI theories, such that specific AI-based technologies emerge as leaders in their respective fields and AI becomes a principal driver of China's industrial transformation. Lastly, by 2030, China aspires to attain a global leadership position in both theoretical and practical aspects of AI. This includes achieving tangible outcomes wherein AI not only drives economic prosperity but also significantly contributes to the applications in a more intelligent society.

In conclusion, three strategic emphases can be distilled from this strategy. Firstly, it is essential for China to ensure its competitive stance alongside other global actors within the realm of AI. Secondly, the development of AI systems should be directed towards serving as catalysts for domestic economic growth, while simultaneously addressing potential challenges, such as job losses attributed to automation. Thirdly, AI should be harnessed to play significant roles in shaping societal order, extending to areas such as education, environmental conservation, and judicial services (intelligent societal applications).

However, when we interpret these three main objectives through the lens of our theoretical framework, their significance becomes even more pronounced. The emphasis China places on enhancing international competitiveness in emerging technologies signifies its intent to foster an image as a viable alternative to Western-produced technologies. In essence, China is motivated by its ambition to be recognized as a technological superpower, particularly by smaller nations (external validation). This aspiration is observable in China's recent diffusion of emerging technologies to different countries through substantial initiatives like the DSR, a subject that will be elaborated upon later in this thesis. Economic growth facilitated by the integration of AI into various sectors, encompassing manufacturing, public services, among others, necessitates that China mobilize all resources. This involves not only the deployment of financial assets, but also the engagement of key actors that might expedite the incorporation of AI into diverse domains. Lastly, the concept of intelligent societal applications, which involves disseminating AI systems across all facets of life - from education to public security - indicates more than merely expanding the ubiquity of AI systems for societal control. It also implies an increase in available data to refine AI systems, even as China continues to implement data regulations and establish ethical standards for AI system development.

Regarding resource allocation, the strategy delineates three comprehensive sets of objectives. Firstly, the establishment of a financial support mechanism, supervised by financial administration, but primarily driven by market forces (Webster et al., 2017). At first glance, this may seem like a straightforward assertion. However, a deeper analysis reveals more nuanced implications. While the statement confirms China's commitment to amassing sufficient resources for AI development, it simultaneously emphasizes the significant role of private actors. This approach, although seemingly incongruous with China's technically non-market-driven economy, seeks to foster domestic competition and innovation, thereby facilitating the mobilization of different actors/resources. Moreover, it implicitly counters international criticism concerning the problematic relationship between private companies and the CCP. By doing so, it aims to assure external stakeholders (states benefiting from Chinese

technology) about the autonomy of private companies. This, in turn, would be a crucial factor in China's external validation as a global technological superpower.

Secondly, the strategy advocates for optimizing arrangements for the establishment of AI innovation bases such as provincial level research laboratories, technological campuses, and various other institutions. Essentially, this strategy is about rallying all potential actors - in other words, mobilizing all available resources - to foster a robust domestic landscape of AI innovation hubs. As the strategy states (Webster et al., 2017, para.120):

"Develop specialized public maker spaces in the AI area, stimulate the precise linkage of the newest technological achievements, resources and services. Fully give rein to the role of all kinds of innovation bases in concentrating talent, finance, and other such innovation resources; make breakthroughs in basic and advanced AI theory and key common technologies; and launch application demonstrations".

Finally, strategy recommends planning domestic and international resources which defined as (Webster et al., 2017, para.121):

"Support domestic AI enterprises to cooperate with international leading AI schools, scientific research institutes and teams. Encourage domestic AI enterprises to "go out," and provide conveniences and services to powerful AI enterprises conducting foreign mergers or acquisitions, share investment, start-up investment, establishing foreign research centres, etc. Encourage foreign AI enterprises and research institutes to establish research and development centers in China. With the support of the "One Belt, One Road" strategy, promote the construction of international AI science and technology cooperation bases, joint research centres, etc.; accelerate the broad application of AI technologies in countries along the "One Belt, One Road." Promote the establishment of international AI organizations, jointly formulate related international standards. Support related sectoral associations, alliances, and service bodies to build globalized service platforms aimed at AI enterprises".

Above mentioned paragraph proves many of the arguments along with the theoretical approach of the present thesis. Encouraging domestic actors including individuals and private companies to 'go out' and create collaborations, merge with companies and direct acquisitions signify Chinese overarching strategy of external extraction (knowledge transfer and in some cases data extraction). Moreover, emphasizing the BRI which also means DSR shows the leading role of megaprojects when it comes to both extraction of resources and external validation that at the end of the day serves for the global 'Digital China' image.

5.3.1.2.2. Implementation of AI policy at the state level

As discussed in the preceding sections, following the announcement of its national AI strategy in 2017, China began to implement this policy, employing a top-down approach along with delegation to local authorities. This constitutes a direct mobilization in our context. In the same year, at the opening ceremony of the Belt and Road Forum for International Cooperation, Xi Jinping provided an indication of China's plans to intensify its mobilization efforts by emphasizing (Xinhua, 2017, para.29):

"We should pursue innovation-driven development and intensify cooperation in frontier areas such as digital economy, artificial intelligence, nanotechnology and quantum computing, and advance the development of big data, cloud computing and smart cities so as to turn them into a digital silk road of the 21st century. We should spur the full integration of science and technology into industries and finance, improve the environment for innovation and pool resources for innovation"

In virtually every significant event, Xi Jinping reiterated similar statements. For instance, during the 27th Central Commission for Comprehensively Deepening Reform, Xi underscored (China Daily, 2022, para.8):

"*With the forces of the government, market and society well combined, national strengths should be mobilized, reasonably coordinated and relevant mechanism optimized to form a synergy in research so that a new national system will be built up to facilitate core technological breakthroughs in key areas"*

Similarly, in that year at the 16th BRICS (Brazil, Russia, India, China, South Africa) summit, Xi Jinping unveiled his intention to further galvanize resources for technological advancement on a global scale by highlighting" China will... mobilize resources for development to step up innovation, research and development" (Ministry of Foreign Affairs of People's Republic of China, 2022, para.10). At this point, a critical question arises: How does China orchestrate resource mobilization at a domestic level? As is inferred from the preceding quotation, China harmoniously intertwines market forces, governmental efforts, academia and societal contributions in the execution of its AI policy. This approach is broadly coined as the 'whole society approach' in relevant literature, and aims at the comprehensive engagement of every resource that could catalyze AI development within China (Sullivan, 2021; Yang and Huang, 2022). From the viewpoint of numerous scholars, this approach offers China a significant advantage over the United States in terms of mobilizing resources—a phenomenon that, within our analytical framework, can be characterized as direct mobilization (Zeng, 2021a). This particular aspect was underscored in a publication by the United States Congressional Research Service, wherein it was articulated as "China's unified whole-of-government effort to develop AI as having a distinct advantage

over the United States" (Sayler, 2020, p.22). Moreover, it is crucial to recognize that the NGAIDP should be viewed as the CCP's aspirational blueprint or strategic roadmap, rather than an authoritative mandate compelling actors to strictly adhere to its provisions (Roberts et al., 2019). The role of strategy in the National NGAIDP is articulated as follows: "It imbues AI with a stamp of approval from the central government and the Chinese Communist Party, both de-risking and actively incentivizing local projects that make use of AI in some way" (Lee and Sheehan, 2018, para.50)

This perspective is supported by the discretionary language used within the strategy. Nevertheless, this does not negate the fact that the CCP employs a direct mobilization approach in the governance of AI policy. The CCP employs a two-tiered strategy in the execution of its AI policy, operating at both national and local levels. It's crucial to note, however, that the overarching strategy is not wholly monitored and controlled by the central government; instead, the central authority delegates certain responsibilities to local governments (Zeng, 2021a). This reality is generally translated into a concept of community of practice (CoP) by various scholars (Qiao-Franco and Zhu, 2022). Zeng's (2021b) research validates the earlier presented argument that there is a delegation of responsibilities to local governments for developing AI applications, while also underscoring their role in direct resource mobilization. This point is cogently articulated by Zeng (2021b, p. 400) as follows:

"This simplified understanding inevitably neglects the nuanced development of China's domestic political economy and its impacts on China's for-eign relations. In fact, decades of scholarship in China Stud-ies have produced a sizable literature that presents a fragmented and decentralized authoritarian system in China".

Hence, the role of the government must be perceived as the supreme entity that orchestrates the mobilization of resources and establishes comprehensive mechanisms to unite various actors, funds, talents, companies (resources) towards a shared objective. Simultaneously, there are certain AI applications that central authority prioritizes and "subsidizes certain AI companies and also instances in which China's science and technology bureaucracy mobilizes to develop certain technologies" (Lee and Sheehan, 2018, para.46).

In terms of AI policy implementation, the CCP established the **New Generation AI Strategic Advisory Committee** in November 2017. This committee, comprising 27 members, five of whom are from the business sector, serves to directly advise the government on strategic developments within the field of AI (Murphy, 2020). It is crucial, however, to perceive the committee's role as providing guidance rather than leading the AI policy direction. Moreover, the MoST instituted **the AI Promotion Office**, which takes a pivotal role in resource mobilization. This office unites 15 different ministries and

governmental bodies, including the NDRC, the MIIT, the Chinese Academy of Sciences (CAS), the Academy of Engineering, the Science and Technology Commission of the Military Commission, and the China Association for Science and Technology (Johansson, 2022).

The AI Promotion Office is tasked with a variety of roles, including the facilitation of implementation, the establishment of an AI Strategy Consultancy Committee to investigate forward-thinking and strategic matters, the assessment of key AI policies, and the support of AI think tank development. In addition, it assists various think tanks in studying significant AI issues, thereby providing robust intellectual support for AI advancement (Department of International Cooperation Ministry of Science and Technology of People's Republic of China, 2017). Consequently, it is reasonable to posit that the CCP occupies the role of the central actor in resource mobilization, given that the initiation of AI policy implementation springs from central authority, rather than from the private sector or other actors. This reveals two key facts. Firstly, it signifies the CCP's continuous vanguard role in resource mobilization, in line with its historical background, despite any socio-political and economic shifts. Secondly, given China's vast geographical and demographic size, the CCP disseminates the implementation responsibility to local governments, merely mobilizing actors for AI development.

Post-2017, the delegation of some authority for AI policy implementation has triggered changes in how the CCP views AI development. Ding (2023), for example, contends that Chinese AI policy has undergone a significant transformation in recent years. Initially, the government exercised direct control over the AI development process following the announcement of the NGAIDP in 2017. However, it has begun to incorporate more private sector entities into its resource pool, culminating in a shift towards more civilian-led initiatives rather than government-driven projects.

This shift reflects the dynamic nature of AI technology. In its early stages, AI development was more nascent, but advances, such as the success in generative AI, have made AI more akin to technologies like GPT, necessitating the involvement of more private actors as the usage of AI has become increasingly prevalent across various sectors.

This, however, does not suggest that the CCP lacks the authority to suspend, defund, interfere with, or dismantle AI-related projects, especially in light of China's recent tech crackdown (de-tycoonification) aiming to regulate large tech companies through legal measures (Niewenhuis, 2021, Wheeler, 2021). Instead, it exemplifies the CCP's adaptability in response to rapid changes in technology development, counter to many expectations regarding the relationship between authoritarianism and AI development, which assumed direct control over every stage of AI evolution (Zeng, 2022). Upon establishing the governmental bodies tasked with promoting AI development, including research and development,

China initiated the process of funding actors via diverse channels. Government funding can be segmented into five primary categories: The National Natural Science Foundation of China (NSFC), National Key Research and Development Programs (NKP), state-backed venture capital funds (commonly known as government guidance funds), the Mega Projects program, and the Bases and Talents program (Acharya and Arnold, 2019). In addition to the major funding sources, there are alternate mechanisms, such as the 'N+1' model, that function as supplementary tools for AI development (Johansson, 2022).

Determining an exact figure for total government funding is challenging due to the sensitive nature of AI technology and the tendency of the Chinese authorities to either classify or inflate exact numbers. A recent study suggested that authoritarian countries, including China, overstate their annual GDP by a factor of 1.35 compared to their democratic counterparts (Martinez, 2022). For instance, if the actual growth rate is 10%, autocratic countries report it as 13.5%.

A report by Acharya and Arnold (2019) suggests that AI R&D spending in China was somewhere between an estimated lower limit of $1.7 billion and an upper limit of $5.7 billion in 2018, channeled through the aforementioned funding routes. We can further track China's investment trends in AI development by scrutinizing private investment figures. This is especially relevant because the dynamics of China's private sector markedly diverge from those of Western countries due to its state-led economy. A unique feature of this economy is the presence of Communist Party offices within private companies, enabling the CCP to directly influence their economic activities (Grunberg and Drinhausen, 2019; Yan and Huang, 2017). According to the AI Index provided by Stanford University, Chinese private investment in AI stood around $10 billion in 2020, escalated to $17 billion the following year, and then receded to $13.4 billion in 2022 (Stanford University Human Centered Artificial Intelligence, 2021; 2022; 2023). Despite a slight decrease in 2022, Chinese companies, specifically GAC New Energy Automobile, with $2.54 billion in private investment, and ASR Microelectronics, a semiconductor industry company with $1.08 billion, secured the top two positions among global companies in terms of investment volume. Concurrently, this trend was not exclusive to China. For instance, private investment in AI development in the US saw a rise from $23.6 billion in 2020 to $52.88 billion in 2021, followed by a modest decline to $47.36 billion in 2022. This fluctuation in investment figures can be, to a certain extent, ascribed to the global economic recession and supply chain disruptions brought on by the COVID-19 pandemic, as opposed to a diminished interest in the field of AI development (Stanford University Human Centered Artificial Intelligence, 2021; 2022; 2023). In addition to these activities, local governments have formed financial instruments in conjunction with private actors. For example,

the Shanghai Artificial Intelligence Industry Investment Fund, an AI-specific investment pool, was inaugurated in 2019. This initiative was spearheaded by a consortium comprising private enterprises, with a staggering capital commitment of $14 billion (Johansson, 2022). Beyond that, distinct government institutions have their own direct funding mechanisms, particularly through public procurements, which enable domestic firms as well as public and private R&D centers to enhance their markets and research capabilities. For instance, Fedasiuk et al., (2021) assert in their study that the PLA invests approximately $1.6 billion annually into AI systems via public procurements. More significantly, they posit that the companies reaping the most benefits from these procurements are not state-owned enterprises, but instead private companies established after 2010.

Following the successful mobilization of government bodies and the allocation of necessary funds, China embarked on the mobilization of its 'National Champions' - prominent tech corporations - with a common objective of achieving global AI supremacy. These companies were each assigned specific responsibilities that closely matched their particular areas of expertise. Simultaneously with the unveiling of the NGAIDP in 2017, the MoST introduced a program called National New Generation Artificial Intelligence Open Innovation Platforms (AIOIPs). This program aimed to mobilize large tech companies, bestowing upon them the responsibility to forge a robust AI ecosystem through the development of new projects within specified domains (Ministry of Science and Technology, 2019). A significant aspect of the AIOIPs program is its mandate requiring the selected companies to share acquired data. This was accomplished by establishing open-source data libraries, intended to foster the development of further AI applications. In addition to this, the companies were obligated to engage in Research and Development activities, participate in the ecosystem, and provide support to entrepreneurship, particularly focusing on small and medium-sized enterprises (SMEs) (Larsen, 2019). In essence, this requirement denotes the sharing of data extracted from the public, although the specifics of this data sharing provision were not clearly detailed in the official document. Yet the reflection of CCP's desire to employ direct mobilization was clear in the official document as it states: "Build an open ecosystem and promote the transformation of core technological achievements into commercial products through the integration of human, technical, data, and supply chain resources" (Ministry of Science and Technology, 2019, p.2).

During the first wave of mobilization, four tech behemoths were chosen: Baidu, often referred to as China's Google, was assigned to autonomous driving; Alibaba, the Chinese counterpart to Amazon, was tasked with developing a 'smart city'; Tencent was given responsibility for medical imaging; and iFlyTek was designated to work on smart audio applications via natural language processing. In 2018,

SenseTime, focusing on computer vision, was added to this national AI ensemble (Larsen, 2019). In 2019 the MoST started the second wave of mobilization by adding 10 more tech companies into the national team. These were YITU Technology (computer vision), MiningLamp Technology (smart marketing), Huawei (AI-related software and hardware development), Ping An (fintech), Hikvision (computer vision/ video perception open platform), JD.com (smart supply chain systems), Megvii (image perception), Qihoo 360 (cybersecurity), TAL Education Group (AI-related education systems), and Xiaomi (smart homes) (Roberts et al., 2019; Johansson, 2022).

In the wake of successful mobilization of large technology firms by the CCP, the Office of the State Council of the People's Republic of China promulgated a policy document titled, 'Guiding Opinion on Promoting the Standardized and Healthy Development of the Platform Economy.' This decree advocates for the expansion of platform economies and their confluence with various stakeholders, encompassing governmental entities and SMEs across the nation. Of paramount importance, the directive underscores the mandate of "Strengthening the sharing of platform data with government departments."

This provision can be construed as a call for intensifying collaborative efforts in data sharing between corporations and governmental parties. The interpretation implies that data accrued either by businesses or government agencies could be reciprocally utilized to augment artificial intelligence systems (Office of the State Council, 2019, para.15; Zhang and Gong, 2023). Evidence of these initiatives can be observed in various instances. For example, Tencent's AI Medical Innovation System (Miying, as referred to in Chinese) is being deployed by public hospitals to facilitate cancer diagnoses via AI-powered medical imaging tools. By estimates, over 100 such applications have been created, attributing to the concerted mobilization of private sector entities in China (Wei, 2020). Additionally, iFlyTek collaborates on a shared initiative, known as Project 206, with the Shanghai courts aimed at reducing their workload, specifically targeting judges' tasks (Qi, 2019).

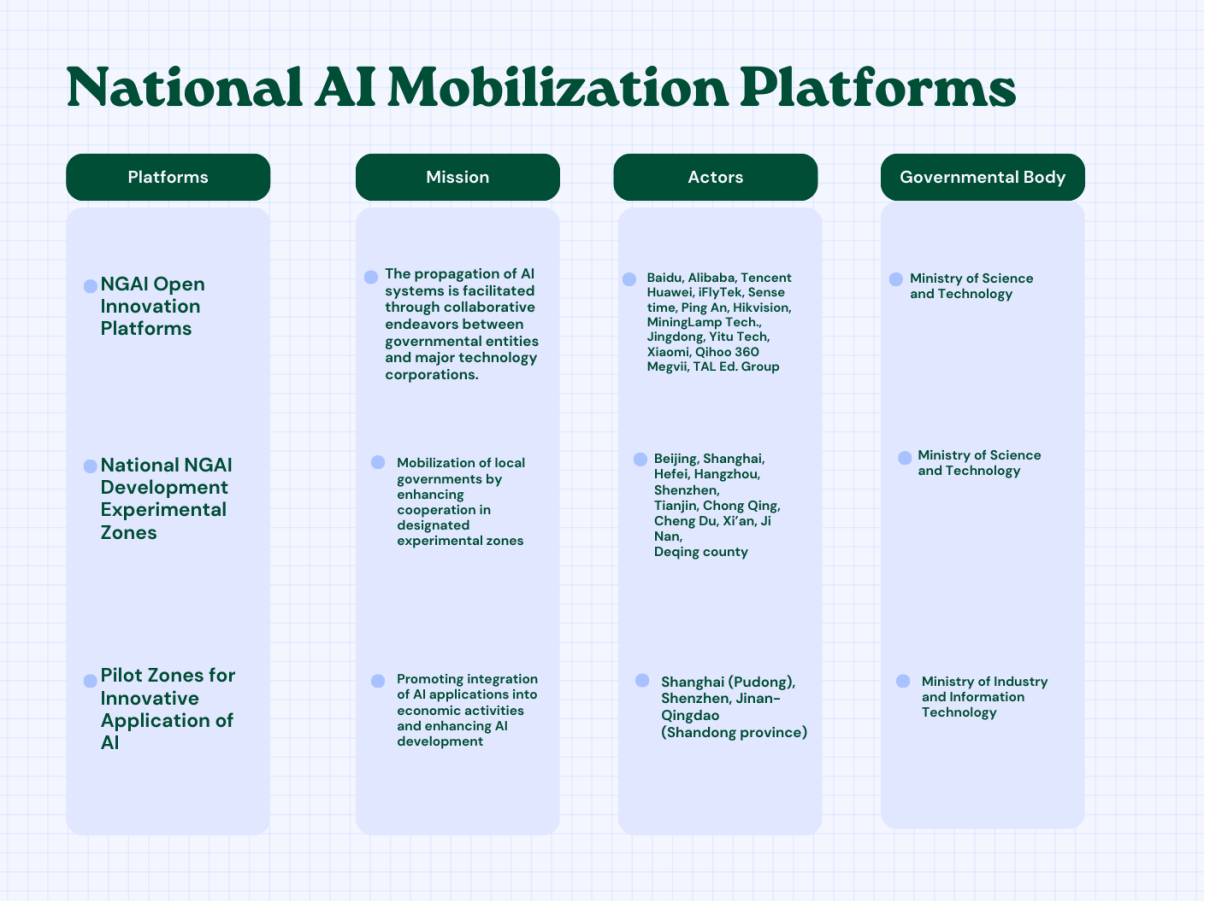


Figure 10. National AI mobilization platforms of China (Source: Author's compilation)

These collaborative ventures and partnerships have indeed fostered resource sharing between governmental entities and private sector participants, simultaneously offering a testing ground for newly developed AI applications. In 2019, the CCP initiated the establishment of experimental pilot zones designed to expedite AI development. This was a novel development for the CCP, reminiscent of the Special Economic Zones established during the Deng Xiaoping era and the creation of the National High-Tech Industrial Development Zones (HIDZs)—a number that has grown to encompass 173 such zones since their inception in 1988 (Groenewegen-Lau and Laha, 2023). According to the MoST (Ministry of Science and Technology, 2020, para3), the strategic objective for the creation of these AI development pilot zones is:

"to encourage the expansion of China's AI industry in cities where it has already taken firm root. The Chinese government, at both the central and local levels, confers benefits on AI pilot zones, such as financial support and favorable local regulations. In exchange, the AI pilot zones are expected to focus on applications of AI that bring practical economic, social, environmental, or other benefits to the local area"

According to a policy document issued by the MoST in 2019, the initial wave of pilot zone establishment encompassed seven regions: Beijing, Shanghai, Hangzhou, Hefei, Shenzhen, Tianjin, and Deqing County, which is situated near Hangzhou (Ministry of Science and Technology, 2020). The subsequent wave saw the creation of pilot zones in Chengdu, Chongqing, Xi'an, and Jinan (Ministry of Science and Technology, 2020). MoST had aimed to establish 20 such zones by 2023, a goal successfully realized ahead of schedule in 2021 (Johansson, 2022).

Concurrently, MIIT has also been instrumental in creating AI innovation zones in eight different regions across China. Although there is considerable overlap in the scope of work of both ministries, a notable distinction lies in the MIIT's innovation zones' heightened emphasis on innovation-driven strategies (Baruzzi, 2021). Mirroring the mobilization of private actors based on their respective expertise and aligning goals with overarching objectives, all development and innovation zones were assigned different areas of AI specialization. For example, while Guangzhou concentrates on virtual and augmented reality, as well as image and speech recognition, the Shanghai pilot zone undertakes research and development related to high-performance smart chips, drones, robots, and intelligent medical devices (Wang and Ren, 2023). On September 29, however, the Ministry of Science and Technology (MoST) released an updated version of the AI pilot zones plan. This revised edition stipulated four central tasks. The first involved executing demonstrations of AI research and development to bolster economic and social progress. The second task called for implementing AI-based policy experiments to forge an institutional environment. The third task of particular significance in terms of resource extraction, required conducting AI-based social experiments and reinforcing the theory of social experimentation, methodologies, and data accumulation. Lastly, the plan advocated for promoting the construction of AI infrastructure to enhance overall AI development (Ministry of Science and Technology, 2023). Moreover, for those cities contemplating the establishment of development zones, the plan outlined four requisite conditions pertaining to resources that local governments should possess, as outlined in the document (Ministry of Science and Technology, 2023, p.6):

"*1-)* ***Wealth of Scientific Education Resources:*** *Applicants shall possess institutions of higher education with AI academies or research institutes, high-level R&D institutions that conduct research in basic AI or key technology fields, and a number of high-level AI innovation teams.*

2-) ***Strong Industrial Foundation:*** *In principle, the applicant shall be a city with a National Independent Innovation Demonstration Zone (国家自主创新示范区) or a China National High-Tech*

Industrial Development Zone (国家高新区) and one that has clearly indicated the development of AI as a key industry direction, where the core AI industry exceeds 5 billion yuan Renminbi (RMB) in scale and AI-adjacent industries exceed 20 billion RMB in scale.

3-) ***Sound Infrastructure:*** *The applicant shall possess rich data resources, relevant data platforms, big data centers, and cloud computing centers and well-developed network infrastructure including mobile communications, the Internet of Things (IoT), and the industrial internet. Priority is given to cities that have deployed national new generation AI open innovation platforms.*

4-) ***Clear Support Measures:*** *The local government shall attach great importance to the development of AI and has issued development plans or implementation opinions concerning AI, has clear policy measures for the development of AI, and provides support for talent, funding, programs, bases, and other aspects."*

Upon conducting a thorough examination of the conditions outlined above, one can deduce several key conclusions. Initially, as explicitly stipulated in the document, the MoST requires that local governments, who stand to gain from both incentives and governmental support, must already possess the essential resources for AI development, which include data, talent, and computing power. Hence, it is conceivable to argue that direct mobilization is initiated from the top, with the CCP setting the minimum standards for participation in AI development, thereby compelling actors to mobilize resources such as data, computing power, and talent. In other words, within the realm of AI policy, the CCP's main function entails mobilizing both private and public actors, outlining immediate and long-term objectives, determining the criteria for involvement, enforcing baseline regulatory standards, and intervening in AI development processes when necessary. Secondly, for local government entities and private corporations, there exist potent incentives that serve to intensify the competitiveness of local actors, with the aim of securing a substantial portion of benefits (Johansson, 2022). Arcesati (2021, para.68) posits that actors participating in AI development "have political, financial and reputational incentives to develop and supply AI products tailored to the system's needs".

The competition among actors, particularly on a regional basis, is actively monitored by central authorities. For instance, the Chinese Institute New Generation Artificial Intelligence Development Strategies, a think tank affiliated with Nankai University, has been annually releasing indexes related to the competitiveness of AI development since the start of 2018. As per the published indexes, Beijing maintained the top ranking for four consecutive years (2018-2022), while Guangdong, where Shenzhen city is situated, occupied the second position. Meanwhile, Shanghai was placed third in terms of AI competitiveness for the same period, 2018-2022 (Liu et al., 2022). The consistent rankings of these

regions can be attributed to two primary factors. Firstly, the regions mentioned above are considered among the first-tier cities, which are the most developed areas in the country. Thus, they possess a significant first-mover advantage with respect to development. For other regions, catching up is a challenging task, as establishing robust technology infrastructure, fostering academic institutions, and achieving industrial maturity can span decades. Secondly, China's leading tech companies, such as Baidu, Alibaba, and Tencent, tend to prioritize these specific regions, although the regional disparity is not vast (Johansson, 2022).

Parallel to the regional AI competitiveness, the distribution of AI-related enterprises is also concentrated in the three aforementioned regions. According to data from the Ministry of Industry and Information Technology (MIIT), 31.9% of such enterprises are situated in Beijing, 18% in Guangdong, and 16.5% in Shanghai (Ministry of Industry and Information Technology, 2022). The geographical distribution pattern can also be observed within the membership of China's Artificial Intelligence Industry Alliance (AIIA), established in 2017 under the guidance of the National Development and Reform Commission and three major government institutions: MoST, MIIT, and the CAC. As per research conducted by Luong and Arnold (2021), among the 567 AIIA participants, a majority of 439 members (or 71 percent) are located in first-tier cities. Specifically, 244 members are from Beijing, 89 from Shanghai, and 66 from the Guangdong province, which includes the cities of Shenzhen and Guangzhou.

To gain a comprehensive understanding of how the CCP's central direct mobilization is executed at the local level, it is crucial to deconstruct the process of AI policy in terms of both governance and implementation. Therefore, the subsequent section will scrutinize the Shenzhen and Shanghai AI pilot experimental zones and their policies.

5.3.1.2.3 Implementation at the local level: Shenzhen and Shanghai municipal governments' AI resource mobilization

The Shanghai Artificial Innovation Application Pilot Zone, located in the Pudong New Area, was established on May 25, 2019. This marked the inception of the second such zone in China, following Beijing, under a program initiated by MoST (The State Council of the People's Republic of China, 2019). However, it should be noted that Shanghai also houses a second AI pilot zone, under the aegis of the MIIT. Scrutinizing the developments in the year 2019 reveals that the Shanghai local government not only declared the establishment of these pilot zones but also mobilized all accessible resources. This inclination is evident in the official documents issued at the local level. For instance, a press release

from the Shanghai Municipal People's Government, dated May 21, 2019, commences by citing General Secretary Xi Jinping's discourse on science and technology. Thereafter, the document underscores the primary objective of enhancing the city's scientific and technological prowess within the AI landscape, which is articulated as "strive to improve the city's ability of aggregating resources". This can be interpreted within our framework as the mobilization of resources (Shanghai Municipal People's Government, 2019a, para.7).

Within the same year, the Shanghai Municipal People's Government declared the Science and Technology Reward system, an initiative designed to bolster the mobilization process by offering incentives to successful individuals. Intriguingly, the official document disseminated by the municipal government underscored the mobilization effort within the guiding ideology section, stating the need to "fully mobilize the enthusiasm of the whole society to support scientific and technological innovation, inject more momentum to facilitate scientific and technological progress and economic and social development, accelerate the construction of Science and Technology Innovation Center with global influence" (Shanghai Municipal People's Government, 2019b, para.6). According to the framework proposed in this thesis, this again could be interpreted as the mobilization of the whole society. Beyond the previously mentioned reward system, aimed at fostering resource mobilization, the Shanghai Municipal Science and Technology Commission (a department overseeing science and technology development) unveiled future prospects for local talent programs in relation to AI. It emphasized its plan to "Develop the S&T talents cultivation project, work with relevant departments to formulate the plan and policy for S&T talent team construction, establish a complete evaluation and incentive mechanism for S&T talents, organize the implementation of S&T talent program, and promote the training of high-level S&T and innovative talents" (Shanghai Municipal People's Government, 2023b, para.14).Over the subsequent years, the Shanghai local government succeeded in launching a variety of talent acquisition initiatives, including the Future Geese- Formation Talents program and the Shanghai Global Talents Innovation and Entrepreneurship Competition (Shanghai Municipal People's Government, 2023c).

The talent shortage remains a pressing issue not only for China but also for all countries engaged in advanced AI development. As an illustration, estimates presented by the Shanghai local government indicate a substantial demand for AI talent specifically within the Lingang Special Area, approximated to be within the range of 20,000 to 30,000 individuals (Cao and Zhang, 2023). Assessing the overall demand for AI talent in China particularly post the release of the NGAIDP in 2017 offers a clearer perspective. As per a study by the Tencent Research Institute, the national demand for AI professionals in 2017 was double that of 2016, and fivefold the numbers from 2015 (Huang and Fan, 2021).

Indeed, talent shortage is intrinsically linked to the nascent state of the AI field, which is characterized by the rapid emergence of new methodologies, techniques, and applications. Therefore, the evolution of AI technology and the assessment of requisite talent resources are subject to short-term planning, given the array of potential scenarios and independent variables that could impede AI development. This is particularly true for Western countries, where complex issues such as existential AI risk and AI alignment could have unforeseen effects on the existing socio-economic order. However, the situation in China is not dissimilar to that of other countries, as it too is experiencing a 'talent rush.' This is supported by data provided by the MIIT. For instance, while only two policies regarding the mobilization of domestic talent were issued by local governments in 2015, this figure escalated to 31 and 42 in 2017 and 2018, respectively that data demonstrates the rapid intensification of local governments' efforts to mobilize talent (Ministry of Industry and Information Technology, 2022).

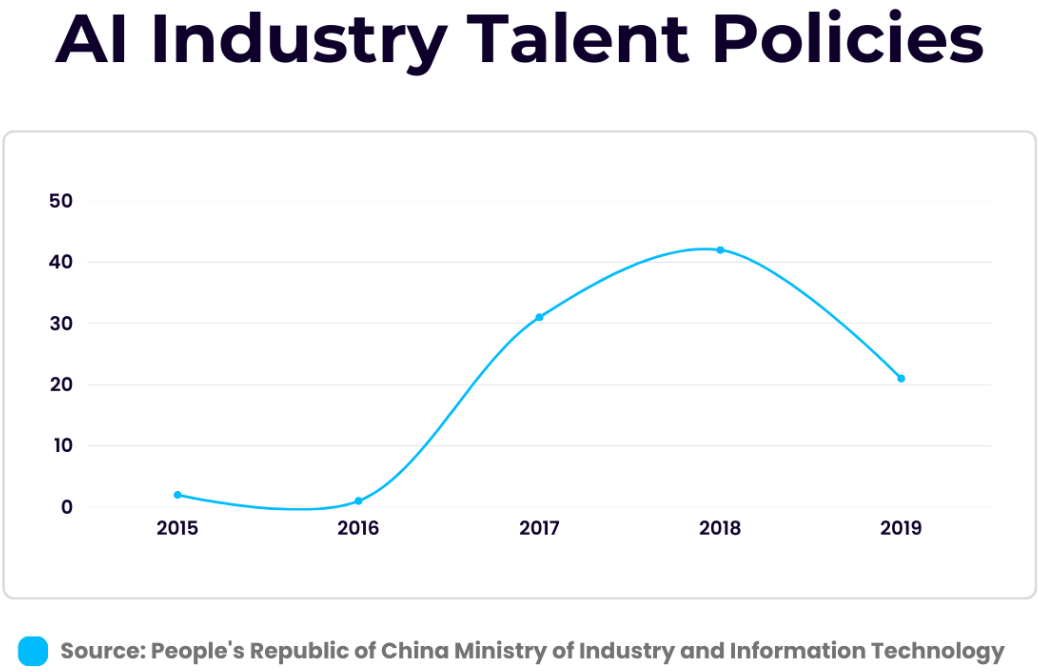


Figure 11. The number of talent policies of China (2015-2019)

The Shanghai local government founded the Shanghai AI Association in 2019 and established the AI Industry Alliance in 2021, which included both local and foreign tech giants such as Microsoft, Alibaba, Tencent, Shanghai-based YITU Technology, iFlyTek and Baidu (Wei, 2019). However, prior to forming

the AI alliance and incorporating them into AI pilot zone projects located in Zhangjiang AI Island in 2021, the local government had already succeeded in integrating big tech companies through the creation of R&D initiatives.

These initiatives included the Amazon Web Services research center, Microsoft-INESA (Group) Co Innovation Platform, and the Shanghai Brain Science and Brain-like Intelligence Research Center (Shanghai Municipal People's Government, 2019a). Additionally, the local government commenced the transformation of universities and research institutes to align them more closely with AI objectives. This was accomplished by establishing various entities such as the Shanghai Artificial Intelligence Research Institute of Shanghai Jiaotong University, the Tongji University-Shanghai Independent Intelligent Unmanned System Science Center, and the Shanghai AI Lab, among others (Shanghai Municipal People's Government, 2019a). Nevertheless, it is crucial to acknowledge that when the CCP and local governments directly mobilize research institutes, they categorize laboratories and allocate tasks based on their capacities, areas of expertise, and affiliations, for instance, whether they are associated with the CAS or MIIT. This is similar to the mobilization of other resources such as private actors. Thus, not all research labs carry equal significance; rather, a certain hierarchy exists among them, denoted by different statuses such as national lab (holding the highest ranking), key lab, state key lab, and provincial key labs, respectively (Groenewegen-Lau and Laha, 2023). Furthermore, when we delve into the reasoning behind the establishment of AI-related laboratories not only in Shanghai but across China, we consistently encounter an emphasis on the importance of resources and their modes of mobilization. For instance, a study on Chinese state key labs conducted by Weinstein et al. (2022) identifies four crucial benchmarks (resources to be mobilized, in the context of the current thesis) necessary for these labs to develop and innovate AI systems. These include human capital in STEM fields, institutional quality and capacity, computing power, and favorable market conditions such as location, business-academia relations, among others. In addition to its laboratories, Shanghai has been hosting an annual World AI Conference since 2019. This esteemed gathering serves as a platform to showcase the latest advancements in AI, with particular emphasis on products and applications developed within the city's AI pilot zones (Shanghai Municipal People's Government, 2019c).

Indeed, the shift towards a more AI and technology-centric focus within higher education is not an exclusive phenomenon to Shanghai. This trend is observable across China, illustrating a national strategic emphasis on AI and its peripheral disciplines. For instance, the Ministry of Education announced in 2018 that 35 universities across China had established an undergraduate major related to AI, according to their report titled 'Notice on the Results of Filing and Approval of Undergraduate

Majors in Ordinary Institutions of Higher Education.' By the subsequent year, this number had surged to include 180 universities, underscoring the rapid expansion of AI-focused academic programs across the nation (Ministry of Industry and Information Technology, 2022). In a similar vein to the hierarchical classification observed in research labs, universities in China are also categorized by the Ministry of Education. They fall into two main classes: 'ordinary universities' and 'double world class universities'. This discernible stratification further underscores the CCP's deliberate and methodical approach to mobilization, illuminating their structured prioritization strategy within the realm of higher education (Ministry of Industry and Information Technology, 2022). While it might be premature and contentious to assert the success of this transformative shift in higher education, designed to bolster talent capacity, there are certain universally accepted metrics that provide a glimpse into the state of AI development and the efficacy of the talent pool in the realm of research. According to Stanford University's AI Index, in 2019, Chinese contributions constituted 22.4% of the total world share of AI publications, outpacing both the US, which stood at 14.6%, and the EU, which contributed 16.4% (Stanford University Human Centered Artificial Intelligence, 2021). Upon closer examination of the affiliation of those who have published AI research in China in 2019, it is evident that government-affiliated institutions play a leading role, accounting for 4352 papers. Contrastingly, those with corporate affiliations were responsible for a relatively fewer 1676 papers. This trend markedly differs in the US, where corporate affiliations dominate, with 3513 research papers, while government affiliations accounted for 2277 papers (Stanford University Human Centered Artificial Intelligence, 2021). In terms of total citations on a global scale, China notably surpassed the US for the first time in 2020. Chinese research contributions accounted for 20.7% of all citations worldwide, while the US trailed slightly with a share of 19.8% (Stanford University Human Centered Artificial Intelligence, 2021). This upward trend in China's contribution persisted in subsequent years. For instance, in 2020, China's share of total global AI publications increased to 31.04%, a substantial rise from the previous 22.4%. In contrast, the U.S.'s share declined slightly to 13.67% from its former 14.6% (Stanford University Human Centered Artificial Intelligence, 2022). In 2021 China’s performance again outpaced the US with %39.78 share while the US declined to %10.03 (Stanford University Human Centered Artificial Intelligence, 2023). Thus, it is justifiable to assert that the noticeable uptrends in both AI-centric publications and citations are tangible manifestations of China's all-encompassing mobilization of resources, especially in the realm of AI research, both theoretical and applied, aligned with the pursuit of the ambitious objectives specified in the NGAIDP.

In terms of policymaking for AI, the local government of Shanghai has been keenly participating in the regulation of AI development, conforming closely to the guidelines set forth by the central authority. In 2017, the local government promulgated a document named "Implementation Opinions on Promoting the Development of a New Generation of Artificial Intelligence in the City." This plan underscored the importance of delineating rules and standards for AI development, thereby setting a clear roadmap for AI initiatives within the city (Shanghai Municipal People's Government, 2019a). Following MoST's decision to establish AI pilot zones, the Shanghai local government took the initiative to form the New Generation AI Innovation and Development Pilot Zone Expert Advisory Committee. This committee comprises a diverse range of experts, including scholars, jurists, ethicists, and business representatives. Their collective effort led to the creation of a comprehensive guideline for AI development titled Action Recommendations for Collaborative Implementation of AI Governance Principles, published in 2020 (Yang and Huang, 2022). In 2022, the Shanghai local government issued a more detailed set of guidelines, following the 44th session of the 15th Shanghai Municipal People's Congress Standing Committee. These were titled "Regulations of Shanghai Municipality on Promoting the Development of the Artificial Intelligence Sector." The official document makes it clear that the local government (as delegated by the CCP central authority) claims a leading role in the mobilization of resources for AI development, emphasizing its strategic importance in orchestrating various actors and assets within the AI ecosystem. Indeed, to illustrate this point, we can refer to Article 5 within the document, which underscores the following (Shanghai Municipal People's Government, 2023, para.8):

"The Municipal People's Government shall strengthen leadership over the development of the AI sector in this Municipality, take lead in formulating a plan for developing the AI sector, incorporate it into the plan for economic and social development, provide guidance and take coordinated steps to resolve major problems encountered in AI oriented science and technology innovation, business cultivation, application scenario development, and development of business environment. The district people's governments shall meet the overall requirements and arrangements of this Municipality, carry out work for AI development in areas under their administration, and strengthen the promotion of AI scenario application and the development of AI business environment. The town/township people's governments and sub-district offices shall strengthen the application of AI technologies and enhance intelligent services and governance in communities"

Of particular note, in addition to the leading role of local government in direct mobilization, the same document (Article 33) emphasizes that "the Municipality shall establish an AI development fund and other government-managed funds to amplify the role of industrial investment guiding fund and to

galvanize various private resources, focusing primarily on early-stage projects and high-growth start-ups in the AI sector" (Shanghai Municipal People's Government, 2023a, para.62).

Shenzhen known as the Silicon Valley (that is home to big Chinese tech companies such as ZTE, Huawei, Tencent) of China is also another city that has been actively involved in AI development in recent years. Following the announcement of the NGAIDP in 2017, the Shenzhen local government unveiled its AI strategy in 2019, entitled the 'Shenzhen New Generation Artificial Intelligence Development Plan'. This strategy aligned with Guangdong Province's own New Generation Artificial Intelligence Development Plan, which projected the AI industry in Shenzhen to exceed a worth of $4 billion (Johansson, 2022). In accordance with the MoST's declaration, the Shenzhen AI pilot zone was also instituted in the same year, 2019. The evolution in both the establishment of pilot zones and governance of AI policy in Shenzhen bear striking resemblances to those in Shanghai. Indeed, the Shenzhen government identified the mobilization and extraction of critical resources for AI development as pivotal. In their local legislation, it was declared, “The support of data, computing power and algorithms is essential to the AI sector’s growth. According to the legislation, the government must create a public data resource system for the AI industry, public data sharing guidelines for AI applications, and an open and industry-oriented computing power and algorithm platform” (Shenzhen Government Online, 2022, para.10). Moreover, similar to the approach taken by Shanghai, Shenzhen's local authorities have introduced a range of legislation and policy documents to amplify their mobilization efforts. For example, in 2021, the Justice Bureau of Shenzhen Municipality unveiled a directive titled ‘Regulations on Talent Work of Shenzhen Special Economic Zone’. Within Article 5 of this documentation, there is an explicit emphasis on the necessity for resource mobilization, as it states (Shenzhen Government Online, 2021, para.6), "The openness of talents shall be expanded to fully develop and utilize domestic and international talent resources. Talents shall be introduced without taking consideration of where they come from, be developed regardless of cost and be made good use of not limited to one pattern."

However, it is reasonable to contend that Shenzhen has been a forerunner in terms of local-level AI development regulation, considering its extensive AI industry that encompasses more than 1300 companies, making it the second largest in the nation (Shenzhen Government Online, 2022b). In 2022, the comprehensive 'Regulations for the Promotion of the Artificial Intelligence Industry in Shenzhen Special Economic Zone' were issued by the Standing Committee of the Shenzhen Municipal People's Government, delineating clear objectives, establishing development mechanisms, and providing guidelines for various actors. Similar to the AI policy documents of the Shanghai Municipal Government,

the Shenzhen local government, specifically through The Municipal Bureau of Industry and Information Technology, exhibits a leadership role over the AI industry in terms of coordination, oversight, and execution (Standing Committee of the Shenzhen Municipal People's Government, 2022). Addressing the AI triad components (Data, Talent, and Computing Power), the regulation outlines distinct guidelines and objectives. Specifically, Article 33 emphasizes the role of data, stating, "We shall promote the circulation and utilization of data in the AI field and promote the transformation of data factors of production into resources, assets, and capital" (Standing Committee of the Shenzhen Municipal People's Government, 2022, p.7). In terms of talent, Article 52 stipulates, "The municipal talent work departments shall formulate and implement talent policies aligned with international conditions, attract international high-end talents, and establish overseas talent reserves. We shall bring together elite AI talents and high-level teams from China and abroad through major projects" (Standing Committee of the Shenzhen Municipal People's Government, 2022, p.11). Lastly, regarding computing power, Article 34 asserts, "We shall encourage and support institutions of higher learning, scientific research institutions, enterprises, and other organizations to build AI computing power ("compute") infrastructure" (Standing Committee of the Shenzhen Municipal People's Government, 2022, p.8).

It is worth noting that Shenzhen's importance stems not just from being home to prominent tech companies but also from its close proximity to Hong Kong. This location has allowed the local government to establish a collaborative venture to develop a computing power management platform within the Guangdong-Hong Kong-Macao Greater Bay Area. This initiative is a fundamental part of a broader strategic vision championed by Xi Jinping for economic and social integration across three regions, collectively hosting over 70 million residents (KPMG, 2020). In prior sections, I've highlighted that computing power forms a critical pillar underpinning robust AI development. Shenzhen, hosting strategic institutions and companies such as the Shenzhen National Supercomputing Center, Huawei, Tencent exemplifies this principle by playing a pivotal role in AI research and data processing. The relevance of this factor has been thrown into sharper relief amid the escalating confrontation between China and the US over emerging technologies or a defining issue of the twenty-first century as Liu and Yang (2023) put it. For instance, it's noteworthy that the AI industry in Guangdong province relies heavily on foreign technology (with estimates as high as 80%) especially for hardware systems like servo motors, reducers, and drives (Huang and Fan, 2021).

However, recent measures such as the US's CHIPS and Science Act, the EU's de-risking approach and stringent embargoes on semiconductor imports including recent Netherlands decision to impose export controls on high-tech Lithography machines to China underscore the growing urgency for indigenous

research into computing in China (The United States Government, 2022; The United States Department of Commerce, 2022). Two years prior to the U.S. introducing the CHIPS and Science Act, China had already announced a comprehensive strategy of its own. This strategy, titled "State Council Notice on the Publication of Certain Policies to Promote the High-Quality Development of the Integrated Circuit Industry and the Software Industry in the New Period", marked a significant step forward in China's pursuit of technological advancement and self-sufficiency (The State Council of the People's Republic of China, 2020). The strategy lays out a plan involving tax exemptions, risk compensation mechanisms, and financial incentives such as loans and subsidies for companies. It also encourages individuals and governmental institutions to recruit talents in a bid to bolster both industry and research & development activities. Mirroring the approaches seen in previously scrutinized strategies and plans, the document illuminates the Chinese standpoint on resource mobilization - referred to as 'innovation resources' within the text. As enunciated in the semiconductor strategy, China emphasizes the need to "optimize innovation resources, such as technology, equipment, capital, markets etc." (The State Council of the People's Republic of China, 2020, p.7), thereby reinforcing China's strategic commitment to the comprehensive mobilization of available resources.

It is safe to argue that the CCP had anticipated this deficit and started mobilizing resources in 2014 to achieve self-sufficiency, three years before the announcement of the NGAIDP. This took form in the establishment of the National Integrated Circuit Industry Investment Fund backed by the Ministry of Finance, also colloquially known as the 'Big Fund' (Jaramillo, 2023). Since its inception, the Big Fund has comprised 74 companies that have collectively invested in 2793 entities, with the majority engaged in semiconductor manufacturing (Hope, 2023). More importantly Shenzhen hosts major semiconductor manufacturers that are deemed the biggest 10 semiconductor companies such as Semiconductor Manufacturing International Cooperation (SMIC), HiSilicon, a semiconductor company based in Shenzhen (second biggest in China after SMIC), research and development center of integrated device manufacturer Wingtech.

The concerted mobilization efforts of the CCP in the semiconductor sector are evident not only in the creation of the Big Fund nearly a decade ago but also in future projections. According to a report published by the Semiconductor Institution Association (2022), China's share of global sales revenue in the semiconductor industry is predicted to rise to 23% by 2030, a substantial increase from the 9% registered in 2021. Intriguingly, the report also projects a decrease in the US's share of global semiconductor sales from 46% in 2021 to 36% by 2030. This suggests a potential shift in the global power balance within the semiconductor industry. However, given the inherent uncertainties and the

long-term nature of these projections, it is premature to definitively conclude that China will be the future global leader in this market given the existence of other major actors such as Taiwan, South Korea and the European Union countries. Another indicator of CCP comprehensive mobilization of resources is the number of registered semiconductor companies. Inkster et al., (2022) provide compelling evidence of the rapid expansion of the semiconductor sector in China, reporting that the number of registered semiconductor manufacturers rose dramatically from just under 1300 in 2011 to an impressive 22,800 by 2020.

Examining the local dynamics of Shanghai and Shenzhen as a foundation, it becomes evident that the CCP has demonstrated noteworthy efficacy in mobilizing a myriad of both governmental and private entities to achieve specific objectives, regardless of the perceived efficiency in resource mobilization processes, such as funding allocation and R&D governance. This effectiveness is manifest not only in the broad-ranging plans and strategies unveiled by central governmental bodies, such as the State Council, the MoST, and the MIIT, but also in the approaches of local administrations which aim to mobilize resources comprehensively, deploying a 'whole society approach'.

The importance of the AI triad - comprising data, talent, and computational power - is acknowledged by local authorities in both Shenzhen and Shanghai. This recognition is reflected in the various individual plans and strategies announced by these local administrations that underscore the importance of these three pillars of AI. The progressively increasing number of such strategic plans being published, particularly those centered on talent development, further underscores this rising awareness.

While many scholars attribute China's technological ascendancy primarily to state-led efforts - an assertion that holds merit for specific sectors and to a certain extent - the analysis provided in this section presents a nuanced account that recognizes the substantial role private companies play in resource mobilization. This role is prominently underscored in almost all the examined strategies, at both the national and local levels, with CCP authorities consistently emphasizing the importance of corporate participation and a market-based economy. It is worth noting, however, that the scope of China's market economy is ultimately regulated by the CCP, suggesting a model of state capitalism. The active role of private companies in resource mobilization is discernible not only through their involvement in collaborative projects with government institutions, but also in the context of specially designed funds and alliances. In conclusion, the CCP's efforts in mobilizing resources for AI development can be characterized as detailed and comprehensive, incorporating nearly all significant actors within China's AI landscape.

5.3.1.3 Domestic extraction

In my prior explanations, I highlighted that the process of resource extraction in the context of state action theory can assume various forms. Typically, the literature attributes resource extraction to two central themes. The first pertains to the domain of political economy, often associated with the concept of state capacity. Here, the primary actors - often the state entities - extract resources from society through different methods, such as the imposition of taxes or the appropriation of other public resources (Cingolani, 2013; Gennaioli and Voth, 2015; Hendrix, 2010). The second aspect revolves around the extraction of earthly minerals and materials, a process states often engage in, particularly in relation to technology (Hinfelaar and Achberger, 2017; Steinberg, 2019; Snyder and Bhavnani, 2005; Johnson, 2019). This practice is well exemplified by China's approach, as it has broadened its global reach for resource extraction, negotiating profitable agreements with various third-party entities. For instance, in their influential book, "By All Means Necessary: How China's Resource Quest is Changing the World", Economy and Levi (2014) assertively contend that China's growing economy has led to an increased demand for resource extraction. This escalating demand has not only contributed to a surge in global prices but also significantly impacted local economies. However, in the context of AI and the subject matter of this thesis, China's quest of domestic resource extraction takes a unique turn: it's fundamentally all about data. The growing discourse questioning whether data is the 'new oil' or if China is the 'new Saudi Arabia' complicates the subject of data, given varying perspectives on optimal data utilization (Hirsch, 2013, Szczepanski, 2020). Yet, this complexity is, in reality, less of a concern for China due to its abundant data resources. With a vast population connected to the internet, China gains a tremendous advantage in both societal control and AI development, particularly in surveillance systems (Chahal et al., 2020; Dawson and Wheeler, 2022; Lin, 2020).

It is worth noting that, long before the implementation of surveillance systems in the 1990s, the CCP had already begun exercising control over internet operations, effectively directing data usage and flow within its territory through the so-called Golden Shield Project, often referred to as China's 'Great Firewall'—an apparent modern-day panopticon (Tsui, 2003). In the eyes of the CCP leadership of that era, the regulation of online communication, sharing, and searches were measures justified by the turbulence emanating from events like the Tiananmen Square protests. Over the ensuing decades, this governance philosophy has evolved, with CCP leadership equating control over the internet with the concept of *digital sovereignty* (Kokas, 2022). In translating this justification into the lexicon of political science, a principal rationale is made markedly evident: regime survival, or in other words, the vanguard

role of the CCP. Griffiths (2021, p.10) elucidates this motive, stating, "When the internet arrived in China during the 1990s, it didn't present a risk to the nation's rulers due to the potential erosion of their control over information, but rather because it threatened to create a platform for organizing against them".

Tracking the number of websites blocked by China proves to be a daunting task as the Chinese authorities have consistently and persistently implemented censorship measures, a fact evident in a plethora of reports and studies. According to the Freedom on the Net Index by Freedom House, as of mid-2022, at least 180 of the most visited 1000 websites globally have been banned, including high-profile social media platforms such as Twitter, Facebook, Reddit, and Instagram, among others (Freedom House, 2022). Interestingly, even popular Chinese-origin global social media apps like TikTok are disallowed in China to prevent exposure to global content. Instead, Chinese residents utilize a localized version of TikTok, known as Douyin. The localization of major global websites in China extends beyond merely TikTok; over the years, China has developed its own counterparts to Google, Twitter, Instagram, and Amazon, in a rigorous effort to maintain stringent oversight of its domestic internet usage and population.

The Chinese daily data footprint is so massive that some estimates predict China will produce 48.6 trillion gigabytes annually by 2025 with more than 1 billion internet users (Liu, 2021; Thomala, 2023). Thus, for CCP authorities, the issue extends beyond merely digital sovereignty to also encompass data sovereignty. This subsumes control over both inbound and outbound data flows, a dimension that holds vital importance in the context of AI, as evidenced by various legislations, regulations, and policies enacted by the CCP in recent years. In 2013, Chinese authorities, particularly the National Bureau of Statistics, entered into agreements with 11 leading internet companies to incorporate big data into government statistics. A year later, the CCP recognized the significance of data and incorporated it into its national strategy. This strategic direction culminated in the announcement of its comprehensive plan titled 'Action Plan on Promoting Big Data Development' in 2015 (Gorman, 2021; Liu, 2021).

It is noteworthy that this period predates the surge in artificial intelligence research and the promulgation of the NGAIDP in 2017. During this time, the integration of big data into AI training processes was not as prevalent as it is today, despite the recognized strategic value of data by both state entities and private companies. The overarching target of the action plan was to capitalize on big data by integrating it into various sectors, including health (through the extraction of individual health data), transportation, manufacturing, geographic data, and public security (The State Council of the People's Republic of China, 2015a). The year 2015 marked a significant milestone for China, not solely

due to the announcement of the action plan, but also because it laid the foundation for comprehensive data extraction. These initiatives would subsequently be detailed in a variety of official plans and notices, a topic I discussed previously in the context of data sharing between the government and the private sector. Same argument echoed by the Grossman et al., (2020, p.7) as:

"The council specifically called for the creation of mechanisms to track economic data, including financing, taxes, audits, consumption, investment, imports and exports, construction, employment, income distribution, the state of electric power and industry, product quality and safety, and energy saving. The State Council said that it envisions building smart cities that will constantly collect data on China's citizens to improve services and, more nefariously, to monitor and control them"

Tracing the evolution of data management and capitalization, a pronounced and growing interest from the CCP is noticeable in the period following the announcement of the Action Plan. This shift is underscored by a surge of initiatives from both private and governmental institutions to infuse data into virtually all sectors of life. In 2016, for instance, the National People's Congress incorporated the implementation of a Big Data strategy into the 13th Five-Year Plan. Significantly, the escalating interest in data is also evident in the evolving stance of the CCP, indicating that the Chinese leadership perceives data as a crucial resource. This shift in perspective was institutionalized in 2020 when the CCP Central Committee and the State Council expanded their field-based allocation system and mechanism by including data as a new factor of production, aligning it with land, labor, capital, and technology (Gorman, 2021). The inauguration of the document titled 14th Five-Year Plan for the Development of Big Data Industry, unveiled in March 2021, serves as additional evidence reinforcing this viewpoint. It commences with the proclamation that "Data are important factors of production (生产要素) in the new era and are

a fundamental national strategic resource" (Ministry of Industry and Information Technology, 2022b, p.1), thereby further validating the aforementioned perspective.

Concurrently, the MIIT unveiled its own big data strategy titled 'Information Technology Big Data Industry Development' in 2016. This strategy aimed at centralizing Chinese datasets – effectively creating national data centers – with the intent to augment the CCP's capabilities in societal management, bureaucracy, and overall enhancement of the people's livelihood (Grossman et al., 2020). By 2018, reflecting a parallel process to the previously discussed resource mobilization, 31 different local authorities had unveiled their own data strategies in alignment with the comprehensive plan set forth by the CCP State Council (Gorman, 2021). In a similar vein, a discernable hierarchy exists

within the governmental bodies responsible for implementing the big data strategy. In this stratified structure, the State Council assumes the apex, followed by its commissions such as the National Development and Reform Commission, and then relevant ministries, such as the MIIT.

Starting from 2012, with respect to the regulatory dimension of data policy, China has implemented an array of laws and guidelines, both binding and advisory, at both the national and local levels. These measures aim at protecting personal data, deterring misuse, and ensuring that Chinese data is confined within the country's borders (See. Table). Even though some scholars draw parallels between China's data regulations (especially the Personal Information Protection Law) and the EU's GDPR, the practical reality deviates significantly from what has been officially enacted. Technically, these laws grant the CCP permission to extract a vast amount of data, although it remains challenging to ascertain whether all extracted data is indeed used for AI developments (Albrecht, 2022; Calzada, 2022).

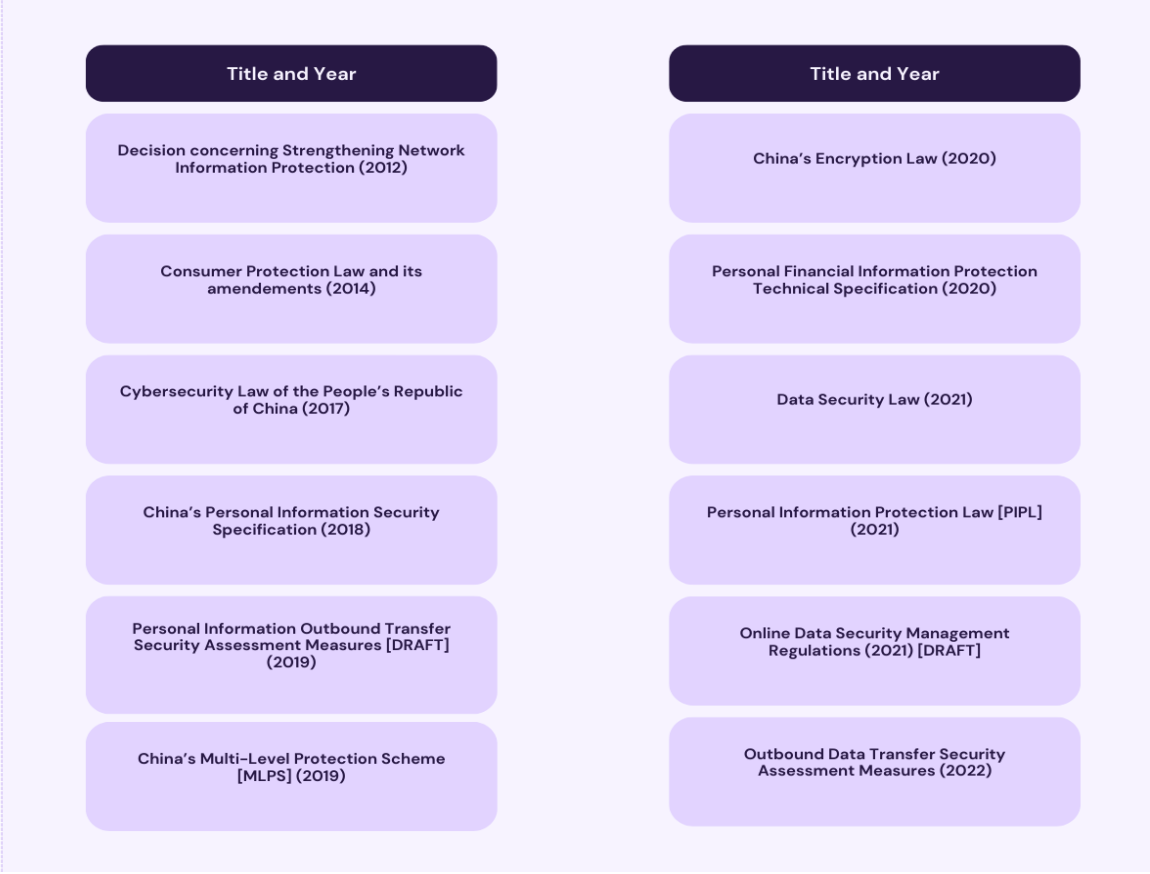


Figure 12. People's Republic of China data regulations 2012-2022 (Source: Author's compilation)

To fully grasp the divergence between the enacted regulations and the practical reality, one must delve into the political concepts that are critical for the CCP. This is starkly evident in Article 12 of the Cyber Security Law of the People's Republic of China, which was put into effect in 2017. Article 12 reads as follows (Creemers et al., 2018, para.13):

"Any person and organization using networks shall abide by the Constitution and laws, observe public order, and respect social morality; they must not endanger cybersecurity, and must not use the Internet to engage in activities endangering national security, national honor, and national interests; they must not incite subversion of national sovereignty, overturn the socialist system, incite separatism, break national unity, advocate terrorism or extremism, advocate ethnic hatred and ethnic discrimination, disseminate violent, obscene, or sexual information, create or disseminate false information to disrupt the economic or social order, or information that infringes on the reputation, privacy, intellectual property or other lawful rights and interests of others, and other such acts"

While Article 12 might seem innocuous at first glance, it is widely recognized that provisions of this sort are often employed not in accordance with universally acknowledged values and laws (such as international humanitarian law), but rather as tools by authoritarian regimes to suppress freedom of speech and undermine the rule of law, rather than protecting individual liberties. This has been evidenced in several instances apart from China, particularly concerning data protection and internet regulations in countries like Russia and Turkey (Flonk, 2021; Human Rights Watch, 2022).

The deliberate utilization of vague language is conspicuously evident in Article 12, with terms such as 'national honor,' 'obscene,' and 'create or disseminate false information to disrupt the economic or social order.' This renders anyone critical of the CCP a potential national security threat, a reality starkly illustrated in Hong Kong following the announcement of the National Security Law in 2019 (China File, 2023). Moreover, the weaponization of the law impacts not only Chinese citizens but also foreigners residing in China. A recent case in point was the enactment of Chinese anti-espionage legislation in 2023. This legislation sparked global criticism, in part due to the broad scope and vague definitions of what constitutes a threat. This is encapsulated by Brusse and Von Carnap (2023, para.1-3) as:

"*These moves could signal an impending crackdown on foreign journalists, researchers, and consultants – targeting almost anyone who exchanges information with international counterparts...* Its amendments define espionage not only as obtaining state secrets but also any other documents related to "national security" (§4.3) – a concept that has greatly expanded under President Xi Jinping. This means that virtually anything – from university research to multinational business dealings or even

social media chats – could potentially fall under its purview and result in severe repercussions (criminal cases of espionage can be punishable by up to life imprisonment)"

Thus, distinguishing China from other autocratic regimes would, at the very least, be a simplistic perspective. Once more, in the Chinese context, the primary contradiction is not what the laws compel the CCP to do, but rather, the sustainability of the CCP's vanguard role, as highlighted in the resource mobilization section. In addition to Article 12, a multitude of other laws exist which justify data extraction practices under the guise of national security concern, notwithstanding the aforementioned data protection regulations. Even more significantly, ambiguous language constitutes merely one facet of the issue. This is because China's understanding of data differs from that of many other nations (primarily democratic ones), as outlined in the Cyber Security Law. For the CCP, data is bifurcated into two categories: 'personal data' and 'important data', both of which are subjected to surveillance and scrutiny due to the perceived national security implications of data (Sacks et al., 2019). Therefore, should an individual be marked as significant, their personal data could rapidly be reclassified as 'important data' under the law, which unequivocally exacerbates the complexity introduced by the ambiguous terminology found in the legislative texts.

In addition to this, one of the most critical laws passed is the National Intelligence Law of the People's Republic of China, ratified during the 28th meeting of the 12th People's National Congress Standing Committee in June 2017. The law's significance can be particularly discerned in Article 7, which stipulates as follows (Brown University, 2019, para.8):

"Any organization or citizen shall support, assist and cooperate with the state intelligence work in accordance with the law, and keep the secrets of the national intelligence work known to the public. The State protects individuals and organizations that support, assist and cooperate with national intelligence work"

As is evident, this article unequivocally mandates that, should any matter be designated as a concern for national security, all related information should be provided by any individual or organization, as necessary. However, given the indeterminate nature of the wording in this and other ratified laws, the scope and type of information required remain ambiguous. Consequently, it appears almost certain that the CCP reserves the right to extract any data generated within its jurisdiction at any time, as they deem fit. In addition to this, within the same legislative framework, Article 14 lends further support to security officials, particularly in instances where an individual or organization refuses cooperation. It states as follows (Girard, 2019, para.8):

"State intelligence work organs, when legally carrying forth intelligence work, may demand that concerned organs, organizations, or citizens provide needed support, assistance, and cooperation"

Upon the proclamation of these laws, numerous states voiced their concerns. These concerns not only pertained to the deteriorating state of human rights, freedom of speech, and rule of law within China, but also to the handling of data by Chinese technology companies, especially when operating beyond China's borders. Even more significantly, the ambiguous distinction between the CCP and these companies - particularly seen in the involvement of Chinese tech firms in projects like the Civil-Military Fusion - raises the issue to a more strategic level, especially for countries that have adopted Chinese technologies. During the tenure of US President Trump, National Security Advisor Robert O'Brien (The White House, 2021, para.2) underscored this concern:

"The PRC government, under the leadership of the Chinese Communist Party, remains free to coerce and coopt PRC manufacturers and services providers to target the United States Government for espionage and information advantage. Some of this activity could further the goals of the PRC's Military-Civil Fusion (MCF) strategy, which calls for all Chinese civil institutions, both public and private, to aid in advancing the capabilities of the PRC military through the acquisition and application of critical and emerging technologies".

Possibly one of the most definitive evaluations concerning CCP's persistent data extraction practices was articulated in a report from the US Department of Homeland Security, titled 'Risks and Considerations for Businesses Using Data Services and Equipment from Firms Linked to the People's Republic of China' (The US Department of Homeland Security, 2023, p.3).

"PRC legal regimes enable potential violations of long-standing global norms by allowing for requirements on PRC firms that result in data theft, manipulation, and exploitation in order to further PRC goals... The CCP's focus on data acquisition supports the goals outlined in the PRC's "Made in China 2025" plan, as well as the Digital Silk Road and the Military Civil Fusion efforts—all of which endeavor to make the PRC the leading global technological superpower by 2049. The PRC has indicated, both directly and through its actions, that data is a high value resource for the next phase of their economic growth".

In light of these circumstances, it is reasonable to assert that China extracts a vast volume of data, particularly domestically, integrating both private and public entities into the data extraction process. Indeed, these activities are largely veiled under the guise of the central authority's (CCP's) security concerns, as detailed in the preceding paragraphs. These concerns, however, are not recent developments, but rather are deeply ingrained in the modus operandi of the CCP since the foundation

of the People's Republic of China in 1949. This pattern of societal control is reminiscent of the ideological embedding of mobilization practices during pivotal periods in modern Chinese history, such as the Cultural Revolution, the Great Leap Forward, and the Opening Up and Reform period. Consequently, when viewed from a historical perspective, it is crucial to acknowledge that the practice of data extraction, or 'harvesting', has long been an integral part of China's socio-political fabric. It was not always dependent on cutting-edge technologies. Instead, these processes were principally undertaken through more traditional and routine mechanisms. This included the 'danwei' (Chinese Socialist workspace or work units), 'hukou' (a system of population registration and control), and 'dang'an' (clandestine political and administrative files established to document citizens' performance and attitudes) (Bray, 2005; Cheng and Selden, 1994; Yang, 2011).

Although the term 'surveillance' is often invoked in discussions around China's data extraction practices, the scope of these activities extends far beyond mere observation and tracking (Chin and Lin, 2022; Huang and Tsai, 2022; Liang et al., 2018). More seriously still, China not only surveils and extracts data but also integrates this information with data harvested via various platforms (thematic clouds), hence underlining the multifaceted and expansive nature of its data extraction paradigm (Xu, 2021). In technical terms, this process is referred to as data fusion. To illustrate with a hypothetical scenario, consider a case where a security camera uses facial recognition technology to identify a car's driver. This alone does not constitute data fusion. However, if the system also scans the car's license plate and employs a Geographic Information System to ascertain the exact location of the car, and subsequently amalgamates these three distinct pieces of information, the process then constitutes data fusion. This is because it involves the integration of multiple data sources to provide a more comprehensive understanding of the subject in question.

Upon meticulous scrutiny of Chinese data extraction techniques, which are categorized in this study as national data extraction platforms (See: Figure 13), the extensive application of data fusion becomes increasingly apparent. For instance, the Sharp Eyes project, implemented during the tenure of Xi Jinping as the General Secretary of the CCP, serves as a prime example. The Sharp Eyes project, or Xueliang Gongcheng in Pinyin, is a comprehensive surveillance program that subdivides each city or town into grid-like segments. This structure comprises numerous individual units, each persistently surveilled by privately or government-owned cameras, some of which are equipped with facial recognition technology (Batke and Ohlberg, 2020). In this extensive project, both public and private surveillance systems extract key data, including facial data from prominent locations such as hospitals, hotels, storefronts, major road intersections, and internet cafes. Moreover, data pertaining to individuals' *virtual identities*

are gathered, encompassing information like media access control addresses, phone numbers, and details from WeChat (the Chinese equivalent of WhatsApp) (Peterson, 2021). Additionally, each local level is granted the prerogative to incorporate new technologies into their surveillance systems. This essentially permits them to fuse the data they extract from individuals, thereby enhancing their surveillance capabilities. A case in point is the northeastern city of Harbin, which has commenced the integration of predictive policing techniques into its surveillance program. This amalgamates a vast range of information, spanning transaction data, location histories, and social connections (Gershgorn, 2021). Interestingly, during the pilot phase of the project, certain local governments, such as Linyi City, even installed specialized equipment on TV boxes. This provision allowed citizens to access a 24/7 live feed, giving them the ability to summon the police at the push of a remote button if they observed anything unusual in the Sharp Eyes project footage (Peterson, 2021).

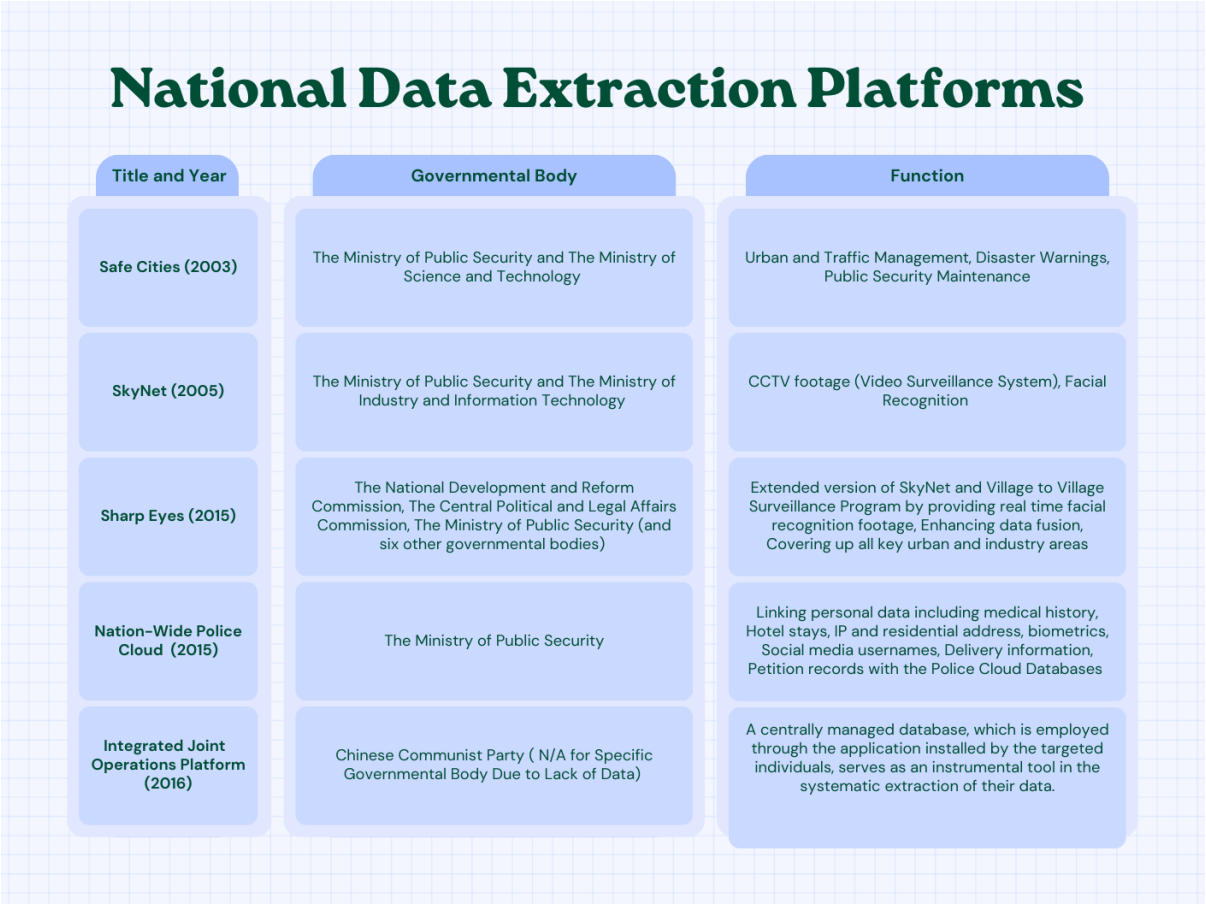


Figure 13. National data extraction platforms of China (Source: Author's compilation)

Unquestionably, the practices of data fusion and comprehensive data extraction extend beyond just the Sharp Eyes project. The Ministry of Public Security launched a program known as the 'Police Cloud' around the same time (2015) that Sharp Eyes was gaining prominence across various provinces. In parallel to Sharp Eyes, Police Cloud also functions as a platform where a diverse array of data - spanning from medical records and delivery histories to social media accounts - is extracted to uphold 'social stability' imbued with Chinese characteristics.

This practice enables the Police Cloud system to map an individual's whereabouts, companions, activities, and even make predictions about their future movements (Human Rights Watch, 2017). It is worth noting that the Police Cloud project is firmly rooted in legislative foundations. These are the notice of the Ministry of Public Security regarding establishing personal data collection system announced in 2014, set of principles titled 'Strengthening the Collection of Basic (Policing) Information' in 2015, and the Office of the Central Committee of the CCP and the General Office of the State Council's issuance of policy titled 'Opinion on the Strengthening of the Construction of Social Security Prevention and Control Systems (Human Rights Watch, 2017). However, it might be justifiable to posit that the covert Integrated Joint Operations Platform (IJOP) epitomizes the zenith of intrusive technology regarding comprehensive personal data extraction. This fact was underscored by leaked classified documents revealing the strategies employed by the CCP in the Xinjiang region, an area largely populated by the Uighur ethnic minority and widely recognized as a test bed for mass surveillance (Leibold, 2020). Technically, IJOP operates as a massive data fusion platform akin to the previously mentioned systems, incorporating biometric surveillance, predictive policing techniques, and facial as well as voice recognition systems (Peterson, 2021). The functions of the platform can be categorized into three primary areas: the acquisition of personal data, reporting on activities and conditions deemed suspicious, and initiating investigations into individuals flagged as potential risks by the platform (Human Rights Watch, 2019). Apart from these functions, the platform is also linked with physical systems such as smart gates (check points) and entrance gates in Xinjiang region where they are located in universities, petrol stations and key public venues (Daly, 2019). As Leibold (2020, p.51) points out: "The gates compare the personal data on an individual's ID card with their scanned facial image (and in some cases fingerprints) in order to corroborate identity as well as identify those on police blacklists".

It is important to highlight that the function of IJOP cannot be considered in isolation from China's domestic anti-terrorism campaign[17] and the so-called 're-education' camps. Instead, IJOP plays a crucial role in classifying and controlling the Xinjiang population within the framework of the CCP's anti-terrorism efforts. At the same time, the region serves as an optimal testing ground for Chinese tech companies, a fact that becomes increasingly apparent when examining the participation of these firms. For instance, Shenzhen-based Taisau supplies smart gates, while Hikvision offers surveillance systems.

Similarly, Sense Time and Megvii (Face ++) deliver surveillance solutions, and Beijing-based CloudWalk provides ethnic sorting through facial expressions, among numerous other technology enterprises operating in the area (Daly, 2019). The breadth of data being extracted in the Xinjiang region is extensive, utilizing tools capable of collecting voice, facial, DNA, and even iris information (Human Rights Watch, 2017b). According to the Xinjiang Data Project undertaken by the Australian Strategic Policy Institute (2019), the IJOP platform procures data from the residents of Xinjiang in several categories. Firstly, under the 'Basic Information' heading, companies and officials compile an individual's name, ID type and number, ethnicity, address, vehicle registration, profession, education level, passport details, phone number, and relationship with the person identified as the head of the household. Secondly, within the "Bio Data" category, elements such as blood type, height, and photographic images are extracted. Thirdly, the 'Religious and Political Status' section garners information regarding a person's political affiliations, religious beliefs and practices, along with the intensity of these beliefs, whether they lean towards the conservative or are more liberal (in the context of religious belief). Finally, in the 'Activities Abroad' section, the platform accrues data about the reasons a person may be seeking asylum or choosing to pursue education abroad, their destination countries, date of departure, any changes of identity made while abroad, and the reasons for leaving Xinjiang.

To encapsulate, the data governance strategy employed by the CCP enables the extraction of vast amounts of data, particularly in regions heavily populated by ethnic minorities such as Xinjiang and Tibet. Despite appearances of enhanced efforts to protect personal data by the CCP and local governments - a stance that may seem commendable to some China observers and scholars - a closer examination of the relevant laws and regulations reveals that the protections afforded are far from absolute.

[17]The 'Strike Hard Campaign Against Violent Terrorism' was initiated in China in 2014.

While on the surface these legal frameworks appear designed to safeguard personal information, in practice, significant limitations exist. This is particularly true for individuals who are under the close scrutiny of the CCP, be they ethnic minorities or opponents of the regime, since these individuals are seen as posing a potential risk to national security or, in other words, to the CCP's role as the vanguard of society.Mass surveillance practices, encompassing everything from biometric data to facial expressions, are ubiquitous not only in regions populated by ethnic minorities, but also in cities and regions where the Han Chinese population is predominant. These surveillance measures are justified by the CCP as necessary for national security and the fight against domestic terrorism. However, the boundaries delineating what constitutes a national security concern remain undefined in existing legislations.

This ambiguity allows for a distinct contradiction between law and practice in the realm of data protection. Although data protection laws ostensibly mandate that authorities respect privacy, alternative legislation and local guidelines authorize arbitrary data extraction practices should the subject be deemed a national security threat.

When examining the extent of corporate participation in these surveillance initiatives, it is evident that major technology companies - as previously noted - are actively providing equipment, offering assistance, and deploying surveillance systems. This trend aligns with the mandates and advisories pertaining to data sharing between government and corporate entities as explored in the section on domestic mobilization. The extent to which data, obtained through these surveillance systems, are being used by tech companies to enhance their AI-based tools remains obscure due to corporate and governmental secrecy. However, given the consensus and evidence within scholarly literature that major tech companies use the Xinjiang region as a testing ground for their AI-based tools, it would not be surprising to discover that these firms are capitalizing on the vast scope of data extraction practices to further refine their systems.

5.3.2 External validation and external extraction

This section zeroes in on China's external validation and extraction strategies within the context of AI development. Within the theoretical framework of the present thesis, external validation is understood as a process whereby an actor or actors assert their status as a legitimate power – in our case, a technological power – thereby earning the recognition of third-party states. External validation takes place in the Chinese context in various means, be it vote buying in the UN, or creating alternatives

organizations to the Western dominated international system such as establishment of Asian Infrastructure Investment Bank (AIIB), GSI and Global Development Initiative (GDI) (Drinhausen and Legarda, 2022; Ren, 2016; Schweller, 2011; Strüver, 2016). Within the analytical framework of this thesis, external validation is achieved through the establishment of technology standards and the extensive DSR projects. As for China's external extraction strategies, the DSR plays a crucial role, particularly in the context of technology and data transfer, which are deemed to be for AI development. However, China's external extraction strategy is not confined to these strategies; it also includes talent acquisition programs aimed at strategies both foreign professionals and top-tier Chinese talent living abroad.

5.3.2.1 External validation

As previously discussed, technology holds strategic significance not only for China's economic expansion but also for its global representation, particularly evident in Xi Jinping's speeches and official documents outlining China's aspiration to become a technological superpower (Zenglein and Holzmann, 2019). However, achieving the status of a technology superpower largely depends on recognition from other countries, as well as the extent to which a country can diffuse its technological ecosystem, including emerging technologies (Comin and Hobijn, 2010; Keller, 2004). Examining the official documents reveals a palpable aspiration for global recognition in the Chinese context. For instance, consider the following excerpt from Xi Jinping's recent report to the 20th National Congress (Embassy of the People's Republic of China in Malaysia, 2022, para.42):

"We have demonstrated China's sense of duty as a responsible major country, actively participating in the reform and development of the global governance system and engaging in all-around international cooperation in the fight against Covid-19. ***All this has seen us win widespread international recognition****. China's international influence, appeal, and power to shape have risen markedly"*

The DSR project, part of the broader BRI announced in 2015, has played a significant role in China's diffusion of technology and its bid for recognition as a technology superpower. As per Chinese official sources, while 149 countries including China have participated in the BRI through the signing of a Memorandum of Understanding, only 16 countries have participated in the DSR. Additionally, 23 countries have been collaborating on Silk Road e-commerce projects, and 34 cross-border land cable infrastructures have been implemented with neighboring countries as of 2022 (Nedopil, 2023; Xinhua, 2022).

Despite concerns from many Western countries surrounding 5G infrastructure and AI-based surveillance systems, the expansive scope of the DSR extends beyond this narrow perspective. As Arcesati (2020) posits, China employs digital development cooperation - ranging from smart health monitoring systems to fiber-optic cable infrastructure - as a foreign policy tool to appeal to developing countries, particularly in Africa, thereby cultivating a reputation as a technological powerhouse[18]. Indeed, this presents a significant challenge for other developed countries in terms of market dominance, considering the scale and scope of Chinese emerging technology diffusion (Hemmings, 2020). As previously discussed, the diffusion of Chinese technology systems is not an overnight policy outcome; rather, it's a consequence of the CCP's strategy to encourage Chinese firms to expand abroad from the 1990s. In the aftermath of China's entry into the WTO in 2001 (and in accordance with China's strategic environment), this trend has seen a substantial escalation. As a result, Chinese-manufactured technologies have become unrivaled, particularly in developing countries (Tugendhat and Voo, 2021).

While Chinese companies learned to manufacture high-tech products, particularly from Western corporations, the CCP leadership implemented two distinct strategies for external validation: offering less expensive alternatives to Western products and expanding into regions where Western companies lack a presence (Can and Kaplan, 2020; Hillman, 2021). For instance, as part of the Silk Fiber Optic Cable project, China has heavily invested in digital infrastructure projects (fiber optic cables) in countries like Kyrgyzstan, Tajikistan, Myanmar, and Afghanistan, where Western countries have complex political histories and unstable relations (Belt and Road Portal, 2019). This insight is essential to understand, as Chinese technology firms not only provide more affordable alternatives to developing and underdeveloped nations, but they also extend their reach to isolated regions. This provides Chinese companies with the opportunity to gather more data via the data centers they establish in partner countries (a point I will elaborate on in subsequent paragraphs under 'external extraction') that Greene and Triolo (2020) suggest that this could lead to a bifurcation of the internet in the near future, with one faction backed by China and the other led by Western countries. Furthermore, on the commercial side, connecting more developing countries may enable Chinese companies to control data flows, thereby better understanding local markets. This could provide a significant advantage to Chinese tech giants over domestic tech firms in these regions (El Kadi, 2019).

[18]As cited in Arcesati (2020), between 2015 and 2017, Chinese tech financing in Africa exceeded the combined funding from African governments, G7 countries, and multilateral organizations.

Indeed, this widened connectivity plays a significant role in propelling the implementation of various DSR-integrated projects, such as smart payment platforms, smart cities, smart health systems, and surveillance technologies. Notably, this infrastructural expansion is not limited to land-based infrastructure in these countries. Chinese state-owned commercial banks have been financing projects like Huawei Marine and its partner company in Cameroon, which are working on the South Atlantic Interlink - a 6000 km cable network connecting Brazil and Cameroon (Eder et al., 2019). Chinese technology corporations are also establishing connections between nations through the BeiDou Navigation Satellite System, China's counterpart to the GPS. This system is considered more accurate than GPS in certain regions, with countries such as Pakistan, Laos, Brunei, and Thailand in Asia fully integrated into the BeiDou system (Ghiasy and Krishnamurthy, 2021). The effectiveness of the BeiDou system not only minimizes China's reliance on GPS, but also fosters interconnectivity between Chinese civilian and military technologies (Center for Strategic and International Studies, 2021).

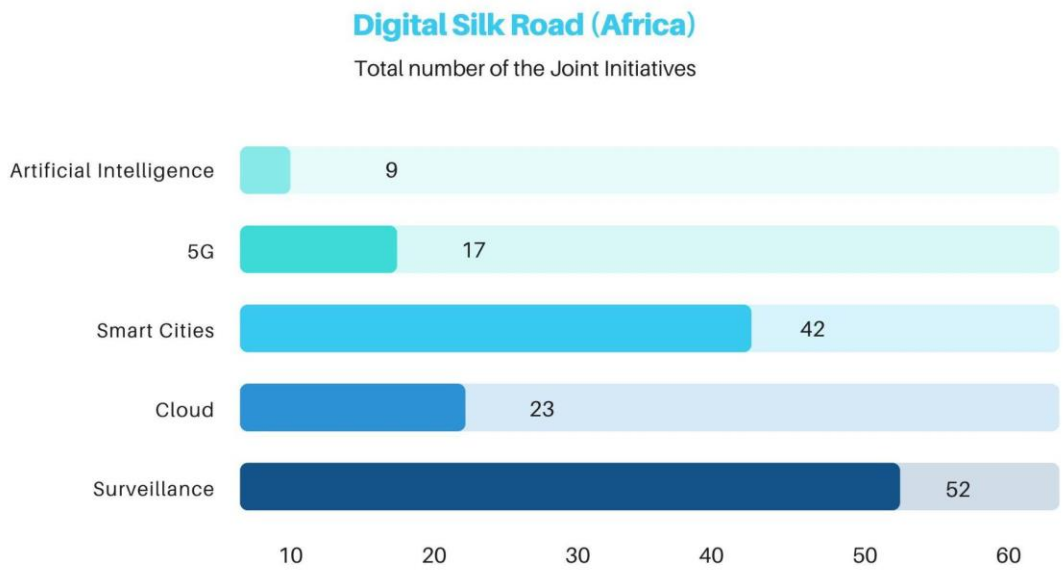


Figure 14. Chinese technology investments and joint projects in Africa

(Source: Australian Strategic Policy Institute (2023))

Considering the rapid diffusion of Chinese technology systems, particularly in developing countries, it is reasonable to propose that the increasing integration of countries into China's tech ecosystem will augment global complexity in the technology realm. A distinct bifurcation is likely to emerge, as evidenced by a growing tech decoupling between U.S. and Chinese technology firms in the second decade of the 2000s, measured by Han et al. (2021). This emerging pattern indicates China's decreasing dependency, resulting in the formation of two distinct blocs: one championed by the West

and the other by China. Potential consequences of this division might manifest in the form of a bifurcation in internet and data flows. This trajectory aligns with President Xi Jinping's ambition, where he declared at the World Internet Conference in 2015, “China will vigorously implement a strategy to make China a cyber great power” (Doshi et al., 2021, p.5)[19]. More importantly, the increasing number of countries adopting Chinese high-tech products not only lends China recognition (external validation) as a global tech power despite the comparative deficiencies of its offerings, but also allows China the latitude to assert its own global standards which the latter can be perceived as an additional instrument of external validation.

Beginning with the ‘strategic permissive environment’ ushered in by its accession to the WTO in 2001, China began its quest to set standards for ICT products. Examples include the WAPI as an alternative to Wi-Fi and CBHD as a Chinese counterpart to DVDs. However, both these efforts faltered on both the domestic and global fronts (McGeachy, 2019). The early failures were partly due to the immaturity of the Chinese tech ecosystem and the absence of global partners willing to adopt these standards. However, the landscape shifted dramatically in the second decade of the 2000s. Comprehensive projects, notably the DSR, facilitated the rise of Chinese technology systems as the de facto standard in many developing countries (McGeachy, 2019; Telenau, 2021). More significantly, in the context of standardization, the CCP has actively focused on emerging technologies, both in terms of domestic development and global diffusion. The inherent nature of these burgeoning technologies enables the CCP to engage deeply in the standardization process. This involvement is primarily due to the emerging technology realm's infancy, which signifies the absence of universally accepted standards, particularly in areas such as AI. Such a landscape provides a unique opportunity for China to influence and possibly lead the development of new global standards, emphasizing the strategic importance of these technologies to the country's overall technological agenda (De La Bruyere and Picarsic, 2020).

The CCP leadership has pursued two main strategies in their standardization efforts over the last decade. These can be seen as a continuation of the ‘two markets, two resources’ initiative (which is also a fundamental strategy for the CCP's external extraction strategy), implemented in the wake of the Third Plenary meeting of the 14th Party Congress in 1993 (U.S.-China Economic and Security Review Commission, 2020)[20]. The first strategy involves strengthening the national standardization system,

[19] It is imperative to note that Xi Jinping's ambition for China to become a significant force in the cyber realm was first publicized in 2014, when he declared that the nation would become a 'great network power.'

[20] The 'Two markets, two resources' plan of the CCP is a strategic approach that concentrates on both domestic and international markets. This includes investing in foreign companies through mergers or buyouts and extends beyond the technology sector to encompass various areas, including raw materials.

while the second focuses on increasing engagement in the international standard-setting process (Telenau, 2021). To enhance domestic standardization practices, the CCP leadership enacted a revised version of the standardization law, originally ratified in 1988, which took effect in 2018 (The US Department of Commerce, 2023). This shift was viewed as a significant departure from the CCP's historical market control, as it permitted market participants to provide feedback to governmental entities, enabling the adjustment of standards in alignment with their requirements (Gargeyas, 2023). Thus, China's approach to setting standards can be characterized as state-led yet market-driven, contrary to the prevailing perception of the CCP exerting stringent control over every facet of the standardization process though some argue that the CCP retains the ultimate authority in these decisions (Gargeyas, 2023; Sheehan et al., 2021). In 2021, the CCP unveiled a comprehensive national strategy dedicated to the standardization of services and products, with a targeted completion date set for 2035. The official documentation clearly emphasizes a model of standardization that is state led yet driven by market forces (Xinhua, 2021, p.2):

"*By 2025, China will have achieved a shift in the source of standards from being government-driven to being driven equally by the government and the market, and standards operations will shift their primary focus from being industry- and trade-driven to focusing on the economy and society as a whole"*

Within the same document, the 'two markets and two resources' strategy is also distinctly highlighted. It establishes an objective of developing robust standard mechanisms tailored for the domestic market, and subsequently exporting these standards internationally, especially to the BRI-aligned countries (Xinhua, 2021, p.9):

"Through the promotion of synergistic cooperation with other Belt and Road countries in the field of standards, China will strengthen the standardization dialogue between BRICS countries and APEC, deepen regional standardization cooperation in the Northeast Asia, Asia-Pacific, Pan-American, European and African regions. China will also promote the sharing of standards information and services, and develop mutually beneficial partnerships for cooperation in standardization"

Upon scrutinizing the implications of China's 'two markets and two resources' strategy, aimed at safeguarding its domestic market while actively participating in global arenas, it's evident that China has wielded remarkable soft power, especially within standards-developing organizations. A salient example is the 3rd Generation Partnership Project, an influential entity entrusted with delineating standards for worldwide telecommunications. The ascension of representatives from Chinese tech behemoths to the

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The strategy manifests a holistic view of leveraging both domestic and international opportunities to access markets and resources, emphasizing China's global economic ambitions.

roles of chairman and deputy chairman ignited notable tensions between the West and China over the standardization of 5G and other nascent technologies. This burgeoning influence underscores China's evolving stature and acknowledgment (external validation) as a pivotal technological force, aligning remarkably with Xi Jinping's ambition to establish China as a 'great network power' (Gargeyas, 2023). This argument is also echoed in the comprehensive report of De La Bruyere and Picarsic (2020, p.11) that states:

"Beijing's standardization plan is not just about China. The China Standards outline is explicit about its intentions to proliferate standards internationally – and to do so by integrating with, and co-opting, global standard-setting bodies. This ambition stems from the "Go Out" mandate, and the bid for international integration that Beijing's planning and industrial action have accelerated since the 2008 financial crisis"

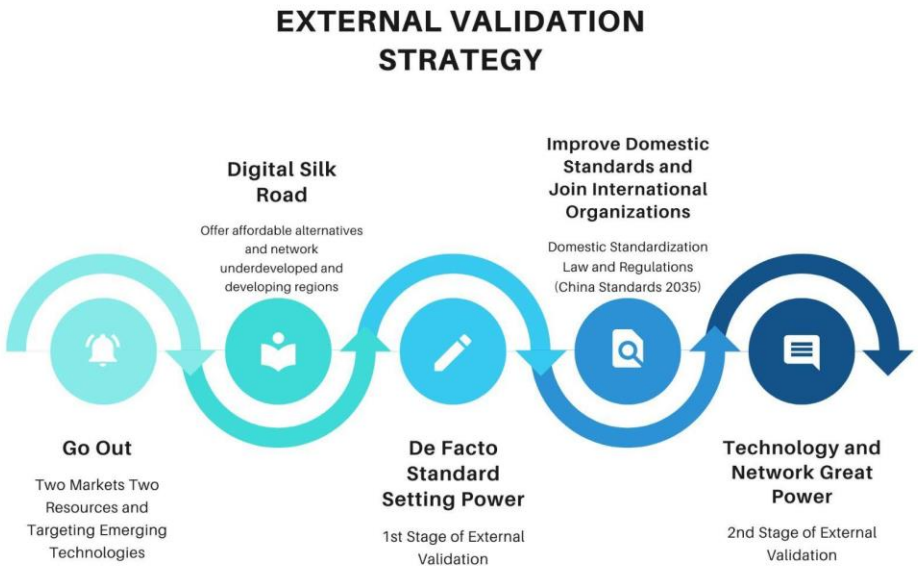


Figure 15. External validation strategy of China (Source: Author's compilation)

Indeed, the full ramifications of Chinese participation in the standardization process are not completely discernible at present. This obscurity is partly attributable to the maturity levels and the ongoing development phase of the related technologies. Research conducted by Feldgoise and Sheehan (2021) reinforces this point, revealing that U.S. representatives in international standardization organizations have not reported encountering any unlawful conduct by Chinese representatives. However, Feldgoise and Sheehan point out "they do believe that U.S. companies' competitiveness in international standards development is threatened by the way China is mobilizing around standard setting" (2021, para. 3). In

light of the aforementioned arguments, the Chinese Communist Party's (CCP) strategy for external validation can be summarized as a multifaceted process. Initially, the CCP encourages major technology companies to venture out and invest or market Chinese tech products to third countries, guided by the 'two markets, two resources' plan. Following this, they offer more affordable alternatives and select locations typically overlooked by Western nations through projects such as DSR. This phase not only promotes the diffusion of Chinese technology and enhances China's status as a global technology power but also enables China to establish de facto standards in developing and underdeveloped regions. Simultaneously, the CCP intensifies regulations and laws to elevate its own standards while actively participating in the international standardization process. I argue that this approach may carry significant ramifications for the global technology policies of other developed nations, particularly the United States. This active role in shaping international standards, coupled with external validation, has the potential to accelerate technological decoupling, especially within the realm of emerging technologies.

5.3.2.2 External extraction

China's strategy for external extraction is integrally tied to its long-term technology policy, encapsulated in the ‘two markets, two resources’ plan. This strategy involves learning from Western counterparts through acquisitions or mergers, creating domestic versions of targeted technologies (often through reverse engineering), and offering more economical alternatives via comprehensive projects (Can and Vieira, 2022). External extraction, in this context, is more complex and has several strategic layers, especially within the realm of AI. This includes contentious issues such as forced technology transfers, industrial espionage, and data extraction and transfer (Hannas et al., 2013; Lindsay et al., 2015, Minagawa, 2007).

Of particular significance in the AI domain are specific parameters crucial for developing robust systems, which I refer to as the ‘AI triad’ within the thesis framework of analysis. China has actively pursued extraction strategies in this area, with talent acquisition being a focal point. This emphasis on talent is reflective of a broader international challenge, as many countries grapple with a shortage of skilled individuals in the nascent field of AI (Anderson et al., 2020). As the DSR began to attract particular interest from African nations, China's reach extended, not only by networking with these countries but also by creating opportunities to access vast quantities of data. This situation is complicated by the fact that individual countries possess their own data protection mechanisms,

theoretically designed to prevent such extraction by foreign actors like Chinese tech companies. On its surface, this line of thinking might seem straightforward, with domestic safeguards maintaining control over data privacy. However, the actual dynamics on the ground prove to be more multifaceted, revealing the complexities of international technology agreements and the often evasive interplay between policy and practice. Consider, for instance, the case discussed by Calzati (2022), who contends that despite Kenya having domestic regulations to protect data sovereignty—aligned with the EU's GDPR—China appears to maintain control over data produced within the country through various AI-based tools. However, it remains challenging to definitively determine the modus operandi of Chinese technology companies' data extraction strategies or ascertain the extent to which they can transfer extracted data back to China.

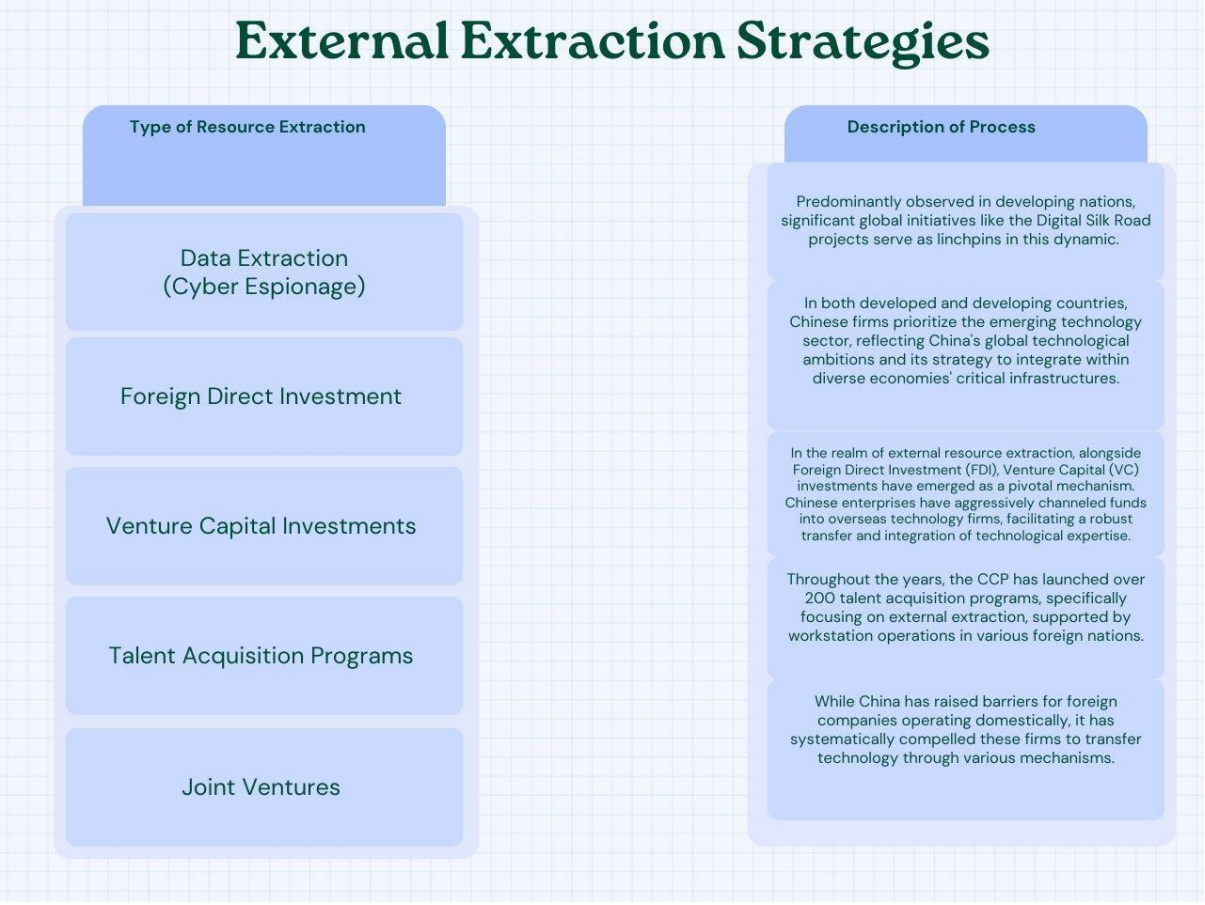


Figure 16. External extraction strategies of China (Source: Author's compilation)

Chinese major technology companies, particularly those like Huawei, Hikvision, ZTE that deploy AI-based surveillance systems and network infrastructures in Africa, play a significant role beyond their tech offerings. They are not only instrumental in constructing public security systems through

surveillance equipment but also have been awarded public tenders to renovate critical government buildings. A detailed report by the Heritage Foundation reveals that Chinese companies have constructed 186 various governmental buildings in Africa, including parliaments, presidential palaces, and military bases, and have established at least 14 governmental intra-communication networks (Meservey, 2020). What is particularly significant in Meservey's findings is the acknowledgment that, although domestic authorities utilizing Chinese technologies are cognizant of potential data extraction by Chinese tech firms, they lack advanced technological solutions to prevent potential infiltrations. Furthermore, the same report sheds critical light on China's capabilities, stating, “The Chinese state also likely has the capacity to parse the high volume of data they would collect in such a surveillance operation. China is one of the world leaders in artificial intelligence technology that is well suited to sifting immense amounts of data” (2020, p.7). This argument finds evidence in the case of the African Union headquarters, which uses Huawei equipment. It has been claimed that the Chinese company extracted critical data and transferred it to Shanghai on a daily basis for five years (Aglionby et al., 2018; Duchatel et al., 2016). The complex and multifaceted nature of China's technological reach and the potential security concerns it raises in the context of data extraction have been illuminated by recent instances of Chinese companies being accused of data breaches and intellectual property theft. Moreover, these concerns have culminated in the strict offset strategies adopted by Western countries in recent years, which have imposed restrictions on Chinese tech equipment.

These vulnerabilities are not confined solely to developing countries. For example, the Dutch telecom company KPN, which utilized Huawei equipment, discovered that the Chinese company had access to critical data pertaining to 6.5 million service users, including the Prime Minister of the Netherlands' phone calls (Henley, 2021). Additional instances are evident in the United States, where Huawei has been accused of stealing trade secrets from companies such as Cisco and T-Mobile, leading to indictments by the U.S. Department of Justice. In Germany, a court in Düsseldorf found Huawei guilty of data extraction and in violation of GDPR. Similarly, the Australian government has identified potential cases of data extraction through Huawei's 5G networks (Cerulus, 2020; Finley, 2020).

It is significant, however, to recognize that although these practices are often attributed to China's espionage activities, data extraction is not a phenomenon unique to China. European countries, for instance, predominantly rely on U.S. companies like Amazon, Google, and Microsoft for data storage solutions (cloud systems), thereby putting their digital sovereignty in a complex position. The situation is further complicated by the U.S. enactment of the Cloud Act in 2018, which mandates U.S. companies to transfer data if required, even if the data is physically stored in a foreign country (Daskal, 2018;

Rojszczak, 2020). As previously noted, the highlighted cases pertaining to data extraction may not strictly be classified under data extraction; they can also be examined within the broader context of cyber espionage activities. However, there exist undeniable instances concerning the data extraction targeting the citizens of African nations. These nations are not merely viewed as prospective partners to further the Chinese Communist Party's technological expansion ambitions, but they are also increasingly seen as experimental grounds for piloting emerging technologies (as in the case of XinJiang region), especially in the realm of surveillance systems (Gravett, 2022).

As discussed in this thesis, much of the existing literature characterizes the spread of surveillance technologies as an exportation of digital authoritarianism, following the Chinese model of public security (Dragu and Lupu, 2021; Lamensch, 2021; Lilkov, 2020). However, this expansion serves an additional purpose for Chinese companies in data extraction. A significant issue within AI systems is their inherent difficulty in recognizing the faces of black individuals, a flaw rooted in the design of the algorithms. This deficiency creates an opportunity for China to transfer and refine data to enhance machine learning models, primarily utilizing information extracted from individual citizens in African countries (Hawkins, 2018; Hemmings, 2020; Simonite, 2019). This finding aligns with documented cases concerning the standardization of ethnic sorting, race tracking, and skin color analytics features within some Chinese technological equipment, such as that produced by Dahua and Hikvision (Asher-Schapiro, 2021; IPVM, 2021). For example, each local region in China, adopts varying national standards for identifying targeted individuals, contingent upon the surveillance system in use. For instance, the standard GA/T1400.3-2017 is employed for ethnic type and skin color analysis, while GA/1756-2020 is utilized for skin color assessments. Additionally, Henan province's public security system references the DB41/T1514-2017 standard for ethnic coding and skin color categorization (IPVM, 2021).

Some might contend that for several African countries, especially those grappling with human rights challenges and endemic corruption, data extraction is not a top priority. Given the significant influx of Chinese loans and investments in the region, these countries might perceive data extraction as a minor issue in the broader context of strategic interests of both parties (Cheng and Zeng, 2023). Thus, it can evolve into a mutually beneficial arrangement, where the perceived drawbacks are overshadowed by the immediate gains for both parties (Cheney, 2019; Gravett, 2022; Wu, 2017). Indeed, as elaborated in the section discussing the Chinese Communist Party's (CCP) standardization process (specifically in the context of external validation), the data extraction approach embodies two principal strategies. The first strategy emphasizes safeguarding national data sovereignty, an inclination often labeled as techno-

nationalism, by enforcing rigid regulations, especially directed at foreign corporations. Concurrently, the approach involves the acquisition of data from international territories, utilizing methods that may be either covert or overt as previously underscored. For instance, the Personal Information Protection Law, which was enacted in 2021, imposes stringent regulations on data transfers by foreign entities. The law, akin to the anti-espionage and national security laws, possesses certain ambiguities. This vagueness grants the CCP discretionary authority to interpret the law on a case-by-case basis, thereby complicating the operational landscape for foreign corporations (Feng, 2019; Zhu, 2022). However, it's critical to understand that this does not imply foreign entities are unable to transfer data. Should they wish to do so, they must enter into a standardized contract, permitting the Cyberspace Administration of China to delineate the scope and categories of data that warrant meticulous examination (Huld, 2023).

In addition to the data transfer practices of Chinese companies (especially in less developed countries where domestic regulations may not be robust enough to counteract both covert and overt transfers), the CCP has actively promoted investment in foreign firms. This includes venture capital investments and FDIs, in alignment with the 'two markets two resources' strategy. It is crucial to recognize that these investments themselves are not illicit transactions. However, the process becomes problematic when it leads to the transfer of knowledge, sometimes forcibly, such as intellectual property and strategic technology blueprints of the newly acquired companies to China (Lee, 2020, Qin, 2019). These transfers are aimed at bolstering the domestic industry, simultaneously allowing Chinese firms to become more competitive, particularly in the realm of emerging technologies. This fact underlined in the US-China Economic and Security Review Commission report as (O'Connor, 2019, p.4) :

"The Chinese government directs and unfairly facilitates the systematic investment in, and acquisition of, U.S. companies and assets by Chinese companies, to obtain cutting-edge technologies and intellectual property (IP) and generate large-scale technology transfer in industries deemed important by state industrial plans"

Chinese companies, especially in the field of emerging technologies, have a noticeable presence in the US For example, the venture capital firm Zhongguancun Capital has invested in various American businesses, including Cohesity, a data management and security firm, and Flirtey, a drone manufacturer that provides services to the US Department of Energy, Department of Transportation, and US Air Force (US-China Economic and Security Review Commission, 2019). There are also joint funds contributed by various stakeholders. In a survey of 42 funds conducted by Kennedy (2019), two

were national, 27 were provided by local governments, and 13 were financed by companies, amounting to a total of USD 73 billion. However, these figures might differ due to the limited availability of data (Can and Vieira, 2022).

Though Chinese FDIs and venture capital investments (outbound capital flow) declined due predominantly to both geopolitical tensions between the US and China and the CCP's tight control over the outbound flow, Chinese companies continued to invest in foreign companies predominantly as mergers and acquisitions (M&A). For instance, in 2021 the total number of M&A was 12,790 (both inbound and outbound capital flow) worth $637 billion despite sharp decline in prices %19 compared to previous year (Interesse, 2022). According to a report by the US-China Economic and Security Review Commission (O'Connor, 2019), the peak period for M&As in the U.S. occurred between 2010 and 2016. During this time, Chinese companies invested in 27 different U.S. semiconductor firms, with a total value of $67 billion, and also invested in 51 distinct AI startups within the country. The peak period for China's total FDI, an outflow of capital, reached $216 billion in 2016. This figure has fluctuated in subsequent years, amounting to $149 billion in 2022(World Bank, 2023e). Even though the U.S. began to pose a complex environment for Chinese companies to invest in, particularly following the election of President Donald Trump in 2016, Chinese companies continued to make significant international acquisitions. For instance, in 2018, Wanfeng Aviation, a Chinese company, purchased Austria-based Diamond Aircraft, which manufactures specially designed aircraft for search and rescue and coastal surveillance. Similarly, China Great Wall Industry Corporation, a satellite manufacturer, acquired Nigerian satellite manufacturer Nigeria Communications Limited. Lastly, the Chinese company Midea bought Servotronix, an Israeli developer of automated systems (Fabbri, 2023).

The examples provided above illustrate the extensive investment by Chinese companies in technology firms around the world. These investments have facilitated the transfer of valuable know-how, particularly in areas strategically important to the CCP's long-term goals of becoming a global technology superpower. However, this external extraction is not limited to foreign companies alone (through M&A). The CCP also leverages international businesses looking to invest within China, commonly through the mechanism of Joint Ventures. According to the most recent data released by the Ministry of Commerce of the People's Republic of China (2020), there were 352,076 joint ventures, constituting 35.2% of all Foreign Invested Enterprises in the country. Notably, among the top 15 investors in China for 2019, the United States ranked 6th, while the Netherlands and Germany were positioned at 8th and 10th respectively. These figures underscore the sustained investment by Western nations in China, reflecting a complex economic interdependence that persists despite escalating

geopolitical tensions. However, establishing joint ventures often requires foreign companies to partner with Chinese entities, especially in sectors deemed sensitive to national security or prohibited for direct foreign investment.

For example, foreign companies seeking to invest in areas such as the exploration and exploitation of oil and natural gas, medical institutions, media, and insurance must have Chinese partners. Additionally, certain sectors require joint ventures with foreign ownership limited to a minority stake. These sectors include automotive manufacturing, aviation companies, educational institutions, and marketing survey firms (O'Connor, 2019; Ministry of Commerce of the People's Republic of China, 2005).

In their comprehensive research, Prud'homme et al. (2018) illuminated the methods through which the CCP systematically extracts technological expertise from foreign entities. Notably, these practices predominantly target firms specializing in nascent or "frontier" technologies eager to penetrate the Chinese market. The study delineated three primary strategies employed by both the Chinese state and domestic enterprises: Firstly, as characterized by Prud'homme et al. (2018), this strategy, dubbed the 'lose the market' strategy, mandates foreign entities to transfer their proprietary know-how. Non-compliance risks these firms being sidelined from the lucrative Chinese market. Secondly, the study found an inclination among domestic courts to interpret statutes in a manner favoring domestic technology transfer, putting foreign enterprises in a precarious position where they often have little alternative but to cede their technology. Finally, given the vagueness of certain Chinese laws and potential judicial biases, some foreign tech entities proactively opt to share their knowledge. This strategy is viewed as a safeguard against potential legal entanglements and to ensure smoother business operations within China.

Therefore, in the context of FDI, it may be concluded that China is meticulously implementing its long-term strategy known as the 'two markets and two resources.' Outbound FDI, for the most part, targets emerging technologies, especially those associated with AI development, utilizing state-backed instruments like the National Integrated Circuit Industry Investment Fund (also referred to as the "Big Fund") (O'Connor, 2019; VerWey, 2019). In contrast, the CCP employs stringent regulations on inbound investments, particularly those that pertain to emerging technologies.

These regulations, including the requirement for joint ventures, generally compel foreign enterprises to align with Chinese partners. Concurrently, the weaponization of legal frameworks and the potential loss of market access in China induce foreign entities to concede to forced technology transfers. This nuanced strategy enables China to extract external resources not only through M&As in foreign

territories but also from foreign firms operating within its jurisdiction (Hout and Ghemawat, 2010; Carbaugh and Wassell, 2019; Sun, 2019; Sykes, 2021).

Beyond leveraging M&As, venture capital, and other financial instruments for growth, the CCP has initiated expansive talent acquisition programs. These programs are intricately aligned with its AI policy framework and aim to attract a wide spectrum of talent—both international experts and overseas Chinese professionals. Simultaneously, these programs exhibit multifaceted and intricately interconnected roles, especially within the domain of emerging technologies. The interplay between talent acquisition, technology transfer, and strategic objectives underscores the nuanced and layered approach of these initiatives. Joske (2020) delineates the scope of these talent programs into three distinct operational tiers, each varying in terms of transparency and legitimacy. At one end of the spectrum are overt operations, which predominantly comprise joint workshops, transparent personal exchanges, and legitimate intellectual property purchases. Straddling the line between transparency and opacity are what might be termed ‘gray zone’ activities. These include undisclosed external employment, grant fraud, and the covert commercialization of research. At the most clandestine end of the spectrum, certain participants, some of whom are undercover intelligence or military personnel, have been implicated in activities such as intellectual property theft, unlawful exports, and cyber espionage.

Over the years CCP announced numerous talent programs not only to bridge the gap in STEM fields but also to allow China extract know-how regarding emerging technologies. A prime example of such programs is the 'Thousand Talents Plan'. Incepted in 2008, this initiative has succeeded in beckoning myriad scientists from diverse global locations. An analysis spanning the period from 2011 to 2016 revealed that 66% of the plan's beneficiaries had prior associations with prestigious U.S. academic institutions like Harvard, Stanford, and Massachusetts Institute of Technology. In contrast, 6% had affiliations with German institutions, and 5% were employed in the United Kingdom (Fedasiuk and Feldgoise, 2020).

Yet, the Thousand Talents Plan represents merely the tip of the iceberg. The CCP's repertoire includes an array of mechanisms designed for knowledge acquisition. These range from student exchange programs to intricate alliances between states and industries. According to the CCP's State Administration of Foreign Affairs Experts, there exist approximately 200 talent acquisition programs. However, Joske (2020) posits that the actual count of such programs might exceed this official figure. Prominent among these initiatives are technology transfer collaborations, exemplified by entities like the Jiangsu Centre of International Technology Transfer and the China International Technology Transfer

Centre. It can be posited that these programs, despite the increasingly restrictive strategic environment post-2016, serve as platforms that promote partnerships with international stakeholders. These collaborations underscore joint endeavors and ensure an unimpeded flow of knowledge and expertise (Can and Vieira, 2022).

Historically, the CCP's dedication to talent acquisition initiatives has deep roots within its strategic political agenda. Importantly, the emphasis on attracting overseas talent and scholars to contribute to China's growth trajectory is not a novel aspiration. It harkens back to principles entrenched during Mao Zedong's leadership, wherein he robustly highlighted the primacy of scientific and technological evolution (Brugger, 2016; Wang, 2015). Before the manifestation of the renowned Thousand Talents Plan, the CCP had already embarked on similar quests, notably with the initiation of the Hundred Talents Program in 1994 and the Changjiang Scholars Award Programme in 1998 (Yang, 2015). Collectively, these ventures encapsulate the Chinese administration's steadfast belief that cultivating intellectual capital is paramount in propelling economic progress and harnessing technological developments (Stoff, 2021). Echoing this sentiment, Hu Jintao articulated that China "must be good at using both international and domestic talent resources, paying equal attention to the independent cultivation and development of talent and to the introduction of overseas talent" (cited in Can and Vieira, 2022, p.12).

Upon a closer examination of the talent acquisition programs, two salient factors emerge, resonating with the CCP's dual strategies of mobilization and extraction. Initially, these talent programs cast a wide net, encompassing not just domestic talent, but also international experts. This is arguably consistent with the CCP's 'two market two resources' strategy. Simultaneously, mirroring the approach in domestic resource mobilization, while the CCP lays out overarching guidelines and delineates the breadth and constraints of these programs, local governments and specific institutions retain the discretion to tailor their talent acquisition initiatives—be they for domestic or international talents—within the framework of the central directives. Consider, as a case in point, the Hefei Institutes of Physical Sciences. This subsidiary of the CAS unveiled its recruitment framework tailored for foreign experts, harmonizing it with both the Hundred Talents Program and the Thousand Talents Program (Chinese Academy of Science, Hefei Institutes of Physical Sciences, 2020). Beyond this particular initiative, the CAS, along with numerous other universities, proffers roles and conducive work atmospheres catered specifically for international experts and Chinese expatriates.

Based on a comprehensive dataset from Georgetown University's Center for Security and Emerging Technologies, up to the present, the CCP has inaugurated 28 distinct talent acquisition initiatives linked

to emerging technologies. These programs are tailored to both international and domestic talent pools (Weinstein, 2023). Particularly prominent among these are the High-End Foreign Expert Recruitment Program, International Training Program for Artificial Intelligence in Chinese Universities: Expert Forum, Huang Jiaqing Youth Talent Program, Cief Foreign Experts Plan, Key Economic and Technical Experts Program, and National Nuclear Power Foreign High-Level Talent Program (Weinstein, 2023). Additionally, the CCP has spearheaded talent acquisition strategies exclusively for individuals holding Chinese passports, particularly in domains perceived as critical to national security. The most significant of these include the Homeland-Serving Action Plan for Patriotic Overseas Chinese, Support Plan for Overseas Chinese Students Who Return to Start Businesses, National Defence Science and Technology Scholarship, Plan for Experts' Return and Settlement in China, and Subsidy Program for High-Level Study Abroad Talent Returnees. In executing these programs, the CCP heavily relies on talent recruitment stations established overseas. Termed 'Overseas Talent Workstations' in Chinese, these stations are managed by Chinese overseas organizations, such as community associations (Joske, 2020). A report by the Australian Strategic Policy Institute indicates a widespread network of these stations, with the US alone hosting 146. Germany and Australia trail behind with 57 stations each, followed by the UK with 49, Canada with 47, and both Japan and France accommodating 46 talent acquisition stations (Joske, 2020).

Evaluating the efficacy of these programs is inherently nuanced, as success metrics can diverge based on the analytical lens employed. Moreover, the contributions of these talents may not always manifest in immediately discernible outcomes. Yet there are scholars who have investigated the success of specific programs in recent years. For instance, Shi et al., (2023) found that Chinese attendees (PhDs in the US) who were part of Young Thousand Talents program were high caliber scientists that were better than their peers in the US in terms of publication record (top %15 research output). Lewis (2023) made a noteworthy observation, indicating that participants who opted not to return to China exhibited greater research output, ranking within the top 10% globally. Complementing this observation, Zwetsloot et al. (2020) identified a waning inclination among Chinese PhD graduates to remain in the US post-graduation, spanning over two decades. Notwithstanding this trend, the US continues to be the premier destination for Chinese scientists, both within academia and the private sector.

Chapter 6: Conclusion

The primary aim of this thesis is to systematically address the question: How has China designed and implemented its strategy towards Artificial Intelligence to effectively mobilize and extract relevant resources? The present thesis begins with a comprehensive examination of the existing literature on AI, focusing specifically on its implications for International Relations, the nexus between Democracy and Authoritarianism in the context of AI, and the national and global security dimensions of the emerging AI landscape. It is important to reiterate that while AI's role in International Relations can be observed in certain specific outcomes—such as changes in the global economy, shifts in the balance of power, and advancements in military applications—the overall impact remains complex and not fully understood. This complexity is reflected in the burgeoning literature that encompasses a wide range of topics, from the racial and gender biases in algorithms to issues of automated disinformation, autonomous weaponry, job displacement, and the effect of AI on economic productivity.

However, what remains conspicuously limited in existing studies is the rigorous application or testing of theories, particularly within the context of International Relations and AI. This lacuna is not solely due to the traditional neglect of technology as a significant factor in International Relations theories; it is also because AI technology itself is in a state of constant evolution, thereby adding a layer of complexity to any theoretical application.

Given the existing lacuna in literature, this thesis seeks to apply a novel approach within International Relations, uniquely integrating both the state action theory and neoclassical realism to examine China's AI policy. Central to this inquiry is the examination of how the CCP and associated governmental agencies strategize and implement policies to mobilize and extract resources related to AI development, delineated as data, algorithms, and computing power. Pursuing rigorous and empirically-grounded findings, this thesis directs its lens on two systemic variables — the restrictive and permissive strategic environment and systemic clarity — as well as one domestic variable: techno-nationalism. By weaving these variables into the analysis, this study elucidates the evolutionary path of China's technological policy, reflecting its interplay with both domestic imperatives and the broader systemic context.

While China's national AI strategy, officially launched in 2017, is a relatively recent development, it may seem challenging to comprehensively address the research question presented. Nevertheless, this thesis demonstrates that the CCP's shifts in technology policy align closely with its strategic environment, as particularly detailed in the sections examining systemic-level variables. These shifts are also manifest in systemic clarity, a construct that articulates how the CCP perceived opportunities and threats in significant global developments. To illustrate, China initially relied heavily on technology

exported from the Soviet Union following the establishment of the People's Republic of China. However, this restrictive strategic environment began to evolve with the landmark visit of US President Richard Nixon in 1972. This visit presented an invaluable opportunity for both China and the U.S. to counterbalance the Soviet threat. Archival findings in this thesis suggest that China's strategic environment transitioned to a partially permissive state around 1978, overlapping with the initiation of paramount leader Deng Xiaoping's reform and opening-up policies. These shifts, particularly post-1978, had significant implications for systemic clarity. The period marked a dramatic expansion of opportunities for the CCP in the realm of technology development while simultaneously the perceived threats diminished substantially, reaching relatively low levels in the ensuing decades.

In the context of China's domestic AI policy, this thesis concludes that techno-nationalism serves as a critical domestic variable. It not only justifies the CCP's strategies for resource mobilization and extraction but also reinforces its vanguard role within China. Indeed, while techno-nationalism gained prominence through the concepts of 'rejuvenation of the Chinese nation' and the 'Chinese Dream' during Xi Jinping's leadership, its roots can be traced back through various epochs of CCP leadership. From the era of Mao Zedong to Xi Jinping's tenure, expressions of nationalism took various forms, encompassing patriotism, 'liberal' nationalism, and techno-nationalism. The thesis ultimately argues that techno-nationalism serves as the most pivotal variable within the framework of China's AI policy. Furthermore, techno-nationalism can be seen as a continuation and manifestation of the CCP's 'two markets, two resources' strategy. This approach essentially aims to protect the domestic market while simultaneously expanding overseas, promoting the sale of Chinese-made products, and extracting resources such as data, talent, know-how and many others. The implications of techno-nationalism also extend to foreign technology companies operating within China. Particularly in the context of joint ventures, China deploys various barriers and leverages its domestic legal framework as a tool for the strategic transfer of technology and expertise.

In the realm of domestic resource mobilization, this thesis delves into the historical context in which mobilization has occurred throughout modern China's history. It concludes that the concept of mobilization is intricately tied to the CCP's long standing vanguard role, a role that has facilitated rapid resource mobilization during key moments in its history. By way of illustration, the Great Leap Forward from 1958 to 1962 serves as a stark instance of the CCP's sweeping mobilization efforts—encompassing both human and material resources—to achieve ambitious goals in steel production and agricultural collectivization, albeit with disastrous consequences for the Chinese populace. Similarly, the

Cultural Revolution witnessed mobilization on a massive scale to eradicate 'bourgeois' values, in accordance with Mao Zedong's directives.

Post-1978, during the era of economic reform and opening-up, mobilization took on new forms, aimed at boosting the Chinese economy. This included the establishment of Special Economic Zones, the overseas training of talent in science and technology, and the fostering of private enterprises to achieve developmental objectives. By the time of Xi Jinping's leadership, China had fully integrated into the global economy. The so-called 'copycat culture,' colloquially known as 'copinism,' began to evolve into indigenous technological innovation, signaling yet another phase of resource mobilization. In this current stage, particularly in the field of AI, the mobilization of three key resources—data, algorithms, and computing power—has come to the forefront, as detailed in the empirical chapter of this thesis.

In this context, this thesis demonstrates that the rate at which resources were mobilized escalated markedly following the announcement of the NGAIDP in 2017. Subsequent to this proclamation, a plethora of AI-related initiatives and plans were unveiled, all aimed at the systematic mobilization of essential resources for AI development. The CCP delineated three overarching objectives in the process of resource mobilization and AI development. First is the pursuit of self-sufficiency, a vision concretized in the 2015 strategy, Made in China 2025. The second objective centers on economic transformation, aiming to seamlessly integrate AI and automation into the domestic economy. Finally, CCP targets to become a world leader both in terms of theory and applications of AI.

The comprehensive strategy for resource mobilization can be encapsulated as follows: The central governing body, represented by the CCP (the State Council), promulgates comprehensive strategic plans pertinent to AI or AI-related subjects—such as the Internet + Artificial Intelligence Three-Year Action Plan. These policy documents articulate both short-term and long-term objectives and standards, serving as a roadmap for coordinated development in the field. It is worth highlighting that the majority of comprehensive plans and strategies scrutinized within this thesis emphasize the criticality of resources in AI, specifically data, algorithms, and computing power. Additionally, the CCP's resource mobilization strategy embraces both a ‘whole-society’ and ‘whole-government’ approach. This essentially implies that all segments of society, encompassing governmental institutions, private enterprises, and individuals, may be enlisted in the endeavor to advance AI development as deemed necessary. Indeed, this integrated approach allows for a more cohesive and wide-ranging strategy for resource mobilization in the context of AI development.

Upon introducing these overarching strategies, the CCP initiates the resource mobilization process via designated governmental institutions. These include, but are not limited to, the Ministry of Science and

Technology, the Ministry of Industry and Information Technology, the AI Promotion Office, and the Cyberspace Administration of China. To enhance its resource mobilization strategy, the CCP actively incorporates private actors into the AI development ecosystem. By designating certain big tech companies as the nation's AI champions, the government not only mobilizes these firms but also incentivizes them to further mobilize resources in alignment with the state's strategic objectives.

In effect, the CCP thereby empowers these relevant institutions with the authority to mobilize resources in accordance with the stipulations of the comprehensive guidelines and plans. There are three distinct mobilization platforms analyzed in the present thesis, these are New Generation AI Open Innovation Platforms, National NGAI Development Experimental Zones, Pilot Zones for Innovative Application of AI. These platforms represent a collaborative nexus where both state and private entities are actively engaged in research, experimentation, project development, and talent acquisition. Moreover, these platforms are typically situated in economically developed regions of China. To elucidate the process through which the CCP delegates authority to local governments for resource mobilization, this thesis offers in-depth analyses of the Shanghai and Shenzhen regions. It also examines the concerted efforts by local governments, universities, and corporate actors to mobilize resources effectively within these platforms.

The thesis reveals that the process of resource mobilization in China's AI development is more complex and distributed than a singular, top-down approach led by the CCP or State Council alone. Although the CCP sets the overarching standards and guidelines, it actively involves a wide array of stakeholders—including corporations, universities, and ministerial bodies—in the mobilization process. This distributed strategy can be understood in the context of China's sheer size in terms of both population and geographical extent, which necessitates a more dispersed approach. A smaller authoritarian nation might have exhibited a more centralized, direct form of resource mobilization. Additionally, the examination of official documents within the thesis underscores the leading role local governments play in AI development. As these local governments serve as de facto extensions of the central authority, their active involvement implies direct mobilization of resources.

In these platforms, the targeted resources for mobilization typically align with the components of the AI stack, emphasizing algorithms where the talent pool becomes crucial, as well as computing power. Beyond these platforms, the thesis concludes that local governments have also instituted diverse strategies to enhance policies associated with data, algorithms, and computing power. As outlined in the empirical chapter, some local governments took the initiative to formulate their own AI strategies before the central authority, the CCP, issued its official guidelines. Subsequently, these local strategies

were revised to conform to central directives. This realignment underscores that, although China's approach to resource mobilization may seem indirect due to the delegation of authority to local entities, the actual process could more accurately be described as direct.

Regarding domestic resource extraction, this thesis primarily emphasizes data extraction, as previously outlined. With the proliferation of internet usage in China, data production has experienced a significant surge and on a global scale, as AI gains prominence, possessing an adequate volume of high-quality data becomes increasingly crucial. This is primarily because the efficacy of training a machine learning model deeply relies upon both the quantity and quality of the data available. Given China's large population and the increasing number of internet users, the country has emerged as a data powerhouse as internet accessibility has expanded over the decades. However, for the CCP, the surge in internet usage has had different implications. The CCP has increasingly sought to control the flow of information online, resulting in the establishment of the 'Great Firewall of China', where the production and dissemination of data are tightly controlled.

Within the selected time frame of 2012 to 2023, this dissertation concludes that the CCP has enacted a range of data-related policies and legislations, including laws concerning individual data privacy. Simultaneously, China has introduced legal frameworks specifically pertaining to national security, which have direct implications for data governance and regulation. After conducting a thorough examination of legal frameworks governing both national security and data privacy, this dissertation concludes that the vagueness and subjectivity embedded within national security laws afford the CCP an unprecedented latitude for data extraction. This, in turn, effectively renders conventional data-protection regulations moot. Furthermore, official documents issued by the CCP, and other governmental bodies increasingly mandate the creation of data-sharing platforms between technology companies and governmental agencies, reinforcing the dissertation's argument regarding the scale and purpose of data extraction. As the thesis concludes, the CCP justifies such extraction under the auspices of national and regime security.

This dissertation concentrates on various data extraction platforms, including Safe Cities, SkyNet, Sharp Eyes, Nation-Wide Police Cloud, and the Integrated Joint Operations Platform. Through these platforms, an array of individual data—from identity information to online purchases—is extracted by governmental agencies in collaboration with major Chinese technology companies. These practices are especially prominent in the Xinjiang region, where the population is largely composed of ethnic Turkic-Muslim minority groups. Indeed, activities often considered to be in violation of fundamental human rights are rationalized under the banner of national security in Xinjiang, effectively rendering individual data

protection concerns irrelevant and obsolete. Furthermore, as documented by international organizations, the Xinjiang region serves as a testing ground for Chinese tech companies. This allows Chinese tech companies for both the deployment of emerging technologies—most of which are surveillance-related—and the extraction of data for projects that are currently under development. In the Xinjiang region, the breadth of extracted data is extensive, encompassing information from facial features and religious beliefs to iris information, primarily gathered through the Integrated Joint Operations Platform.

In the second section of Chapter 5, the focus is on China's strategy of external validation and external extraction, primarily through its technological outreach, especially via the DSR targeting developing and underdeveloped nations. This is particularly salient in African countries where major Chinese tech companies hold significant market domination. The analysis reveals that such dominance enables China to position itself as a technological superpower. This global acknowledgment, or validation, affords China considerable advantages, particularly in setting de facto technological standards, largely because alternative technologies are sparse or non-existent in these regions. The power to define tech standards further strengthens China's external validation. In parallel to this, China has been making strategic moves in international standard-setting organizations, consolidating its influence on a global scale. As highlighted in Chapter 5, China occupies key roles in several of these organizations. The thesis underscores China's calculated focus on nascent technologies, like 5G and AI-powered surveillance systems – areas with both legal and practical loopholes, creating opportunities to influence and set standards.

Indeed, while the DSR may be a relatively recent initiative, launched in 2015 as a component of the BRI, the foundational philosophy behind China's technological expansion is the outcome of long-standing strategies rooted in the 'going out' approach and the 'two markets, two resources' plan. The thesis argues that China's earlier limitations in expanding its digital reach can be largely attributed to two main factors. Firstly, China was undergoing a transformative phase in domestic technology manufacturing, evolving from a 'copycat' culture to one of genuine innovation. Secondly, emerging technologies, particularly AI, were not as advanced as they are today. Moreover, this expansive digital outreach has also relied upon the Chinese strategic environment and systemic clarity as the present dissertation argues that the Xi Jinping period overlapped with the permissive strategic environment, and systemic clarity (low level of threats and high level of opportunities) and the advent of critical emerging technologies.

Alongside the focus on external validation, this dissertation also examined China's external resource extraction, particularly through projects under the DSR initiative. The present dissertation concludes that Chinese technology companies have gained unprecedented access to crucial data by securing public construction tenders for strategically significant structures, including the African Union headquarters, various ministry buildings, and military installations, among others. Additionally, these companies have won a variety of public tenders related to facial recognition systems, thereby gaining access to extensive individual data. Multiple reports and academic studies have documented that these Chinese companies are transferring vast quantities of data back to China. Indeed, these data transfers often take place through covert means, especially in countries with stringent data regulations. Prior research has shown that China has been able to access critical data even in developed nations, as evidenced by the case of the Netherlands, which is elaborated upon in Chapter 5.

In addition to data extraction, China has effectively executed strategies across multiple other layers of external resource extraction. Against this background, this dissertation analyzed talent acquisition programs aimed at both foreign experts and Chinese citizens living abroad in the field of emerging technologies. The dissertation argued that the CCP has successfully implemented various initiatives focused on emerging technologies, thereby enriching its talent pool. This investment in human capital has yielded tangible results, particularly in the realm of artificial intelligence, as evidenced by the increasingly impactful academic output in recent years.

Furthermore, aligned with the 'going out' approach and the 'two market two resources' strategies, China has broadened its influence not merely through DSR. It has also delved directly into foreign markets using diverse strategies such as mergers and acquisitions, venture capital investments, and foreign direct investments. These strategies have empowered Chinese companies to secure access to critical technological know-how, thereby enabling the transfer of such expertise back to China. Therefore, the present dissertation identifies these practices as a form of external resource extraction that is instrumental in shaping China's domestic AI development and policy landscape.

In addition to this, this dissertation concludes that China has also successfully extracted technological know-how from companies operating within its domestic market, particularly through joint ventures. As previously discussed in Chapter 5, the CCP employs various mechanisms to coerce foreign companies into transferring their technology. These methods range from the weaponization of laws and regulations to the imposition of entry barriers that effectively compel technology transfer. Particularly in some sectors deemed critical to national security, the CCP outright bans foreign joint ventures, while in other sectors, Chinese law mandates the inclusion of a domestic partner, with varying equity stakes.

Therefore, it is plausible to arrive at the conclusion that a multi-layered approach forms part of China's strategy for external resource extraction, essential for the advancement of its domestic AI policy and development.

While the scope of this dissertation is specifically tailored to China's AI policy and development, there exists a plethora of avenues for future research to delve into. Other emerging technologies, where China is fast gaining a competitive edge on the global politics – such as 5G networks, quantum computing, semiconductors, autonomous weaponry, and AI-embedded military applications – provide fertile ground for scholarly exploration.

Furthermore, as underscored by this dissertation, China's technological policy invariably aligns with systemic variables, notably the strategic environment and systemic clarity. This insight suggests that varying the time frames for analysis might yield fresh perspectives in future studies. In parallel to this, there is an array of domestic variables ripe for exploration, including but not limited to strategic culture, grand strategy, domestic innovation dynamics, and the pivotal roles of institutions such as the MoST and the MIIT.

Specifically in the context of AI policy, potential studies can dig deeper into the efficacy of current regulations, governance of AI development, state-corporate relations, China's role in global AI governance, China’s clout in setting global standards, and ramifications of China’s tech diffusion particularly in the regions where alternative technologies are. Each of these topics can be approached via diverse analytical lenses and theoretical paradigms, enriching the current scholarly approaches further.

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