



Faculty of Human and Social Sciences

Major in International Relations

Bachelor Thesis

**The role of Innovation:
a new source of Legitimation
for the Communist Party of China**

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Abstract

China has emerged as a prominent player in innovation and technological advancement, with the dual objectives of supporting its own economic growth and reinforcing the legitimacy of its political system. Furthermore, China is determined to make innovation an engine for the next stage of the country's development. This has been made possible through the convergence of several players, including a national-level top-down strategy driven by the Communist Party of China, grassroots bottom-up entrepreneurial dynamism, a hyper-adaptive and hyper-adoptive population, and deliberate foreign direct investment strategies tailored to specific segments. In China's innovation economy, the diverse players have been interacting as a unified whole within the ecosystem machine.

This thesis analyses two hypotheses. The first, the commitment to innovation as a guarantee of the Chinese regime's survival. In this realm, the China model is not only challenging the longstanding belief that an authoritarian regime is incapable of developing a competitive and innovative economy, but also could be reinforcing the survival of its own regime by seeking a new narrative for legitimization. In addition, since Xi Jinping's mandate, there has been a growing intervention of the Communist Party of China in the private market, particularly in the technology sector. This leads to a second hypothesis, which analyzes whether there is a strategic public intervention in the technological sector aimed at building this new source of legitimization of the Party.

In conclusion, despite the significant impact of technological innovation on economic growth, the literature has predominantly overlooked what the underlying intention of the Party-state could be: to legitimize its political regime, and to progressively adopt the role of the private technology sector.

Key words

Innovation-driven development, Communist Party of China, legitimacy and legitimation, Xi Jinping, technocrats, State-Owned Enterprises, Stability, Indigenous Innovation, 创新

Resumen

China se ha convertido en un protagonista destacado de la innovación y el avance tecnológico, con el doble objetivo de apoyar su propio crecimiento económico y reforzar la legitimidad de su sistema político. Además, China está decidida a hacer de la innovación un motor para la próxima etapa de desarrollo del país. Esto ha sido posible gracias a la convergencia de varios actores, entre ellos una estrategia nacional descendente impulsada por el Partido Comunista Chino, un dinamismo empresarial ascendente de base, una población hiper adaptativa e hiper adoptiva, y estrategias deliberadas de inversión extranjera directa adaptadas a segmentos específicos. En la economía de la innovación de China, los diversos actores han estado interactuando como un todo unificado dentro de la máquina del ecosistema.

Esta tesis analiza dos hipótesis. La primera, la apuesta por la innovación como garantía de supervivencia del régimen chino. En este ámbito, el modelo chino no sólo está desafiando la generalizada creencia de que un régimen autoritario es incapaz de desarrollar una economía competitiva e innovadora, sino que también podría estar reforzando la supervivencia de su propio régimen mediante la búsqueda de una nueva narrativa de legitimación. Además, desde el mandato de Xi Jinping, se ha producido una creciente intervención del Partido Comunista de China en el ámbito privado, especialmente en el sector tecnológico. Esto conduce a una segunda hipótesis, que analiza si existe una intervención pública estratégica en el sector tecnológico dirigida a construir esta nueva fuente de legitimación del Partido.

En conclusión, a pesar del significativo impacto de la innovación tecnológica en el crecimiento económico, la literatura ha pasado por alto predominantemente cuál podría ser la intención subyacente del Partido-estado: legitimar su régimen político y adoptar progresivamente el papel del sector tecnológico privado.

Palabras clave

Desarrollo impulsado por la innovación, Partido Comunista Chino, legitimidad y legitimación, Xi Jinping, tecnócratas, Empresas de Propiedad Estatal, Estabilidad, Innovación indígena, 创新

INDEX

ACRONYMS.....	6
I. INTRODUCTION.....	7
II. PURPOSES AND MOTIVES.....	9
III. FIRST PART. THEORETICAL APPROACH.....	10
3.1. State of the art.....	10
3.2. Objectives and research questions	13
3.4. Methodology	14
3.5. Theoretical framework.....	14
3.5.1. <i>Realism</i>	<i>14</i>
3.5.2. <i>Innovation from an International Relations point of view and the case of China</i>	<i>17</i>
3.5.3. <i>Legitimacy and legitimation</i>	<i>21</i>
3.6. Structure.....	24
IV. SECOND PART. CONTEXT, ANALYSIS AND DISCUSSION	25
4.1. Context. Role of the CPC in Chinese innovation	25
4.1.1. <i>Party-state polity features</i>	<i>25</i>
4.1.2. <i>Building China into a great modern socialist country</i>	<i>26</i>
4.1.3. <i>The Populist and the Elitist: a new scenario</i>	<i>28</i>
4.1.4. <i>Evolution of the National Innovation System</i>	<i>30</i>
4.1.5. <i>Party-state policies</i>	<i>33</i>
4.1.6. <i>Regional innovation poles</i>	<i>38</i>
4.2. Analysis. Strategic Public Intervention	41
4.2.1. <i>Key private players in the technology sector.....</i>	<i>41</i>
4.2.2. <i>Involvement of the CPC in the technology sector.....</i>	<i>44</i>
a. <i>State-Owned Enterprises.....</i>	<i>45</i>
b. <i>Golden shares</i>	<i>49</i>
4.3. Discussion. A new source of legitimation?.....	50

4.3.1. <i>Legitimation</i>	50
4.3.2. <i>Innovation: a new source of legitimation</i>	52
V. CONCLUSIONS	56
BIBLIOGRAPHY	61
ANNEX: INFOGRAPHICS	68

ACRONYMS

AI	Artificial Intelligence
CPC	Communist Party of China
GDP	Gross Domestic Product
IPO	Initial Public Offering
IR	International Relations
IT	Information Technologies
MIC25	Made in China 2025
MLP	Medium- and Long-term Plans for Science and Technology Development
NIS	National Innovation System
PBSC	Politburo Standing Committee
PRC	People's Republic of China
R&D	Research & Development
SAMR	State Administration for Market Regulation
SOE	State-Owned Enterprises
S&M	Small & Medium Enterprises
S&T	Science and Technology
UN	United Nations
WTO	World Trade Organization

I. INTRODUCTION

*“Emancipate the mind,
seek truth from fact,
and unite as one to face the future”*

(Deng Xiaoping, 1978, opening-up of China’s economy speech).

In 1978, Deng Xiaoping initiated the reform and opening-up of the People's Republic of China economy. China transformed itself from a predominantly rural-agricultural economy to an industrialized global manufacturing hub and the second largest economy in the world. In Deng Xiaoping era around 90% of the Chinese population lived in extreme poverty. After his death, the percentage dropped to 40%, to 2% in 2013 and to almost zero by 2020, including the coronavirus crisis (Feijoo, 2021).

Through his photography, Patrick Zachman perfectly captures the rapid and dramatic cultural shocks that have taken place in China over the past three decades. In both pictures, 25 years old are portrayed with its grandparents (he and her, from left to right). These images illustrate not only the visible impact of China's economic revolution in terms of politics, culture, cityscapes, fashion, lifestyle, and technology, but also a noticeable transformation in physical appearance.



So long, China, three decades of Chinese contemporary history

Source: Zachman, P. (2015).

Since 1978, three different economies within China can be identified. First being the low-cost assembler, manufacturer, and exporter of the world, the one of the Guangdong factories in 1980s. Second being, and with western multinational firms benefitting from it currently, the size of the Chinese market. That is because having a 500–600 million middle-class consumers is a global phenomenon. Third one and on rise, being the cutting-edge innovation economy (Garret, 2019). An innovation economy that should be define as a machine, not a matter of a moment in China, or of a central or master plan, but rather an ecosystem, an interaction of various players (Zhang, Dodgson, & Gang, 2021). A combination of both top-down, as in high-speed rail and government subsidies for electric vehicles, but also bottom-up, being the clearest example mobile payments with Alipay and WeChat Pay, which are globally dominant (Garret, 2019).

The aim of this paper is to study the means and ends of innovation under Xi Jinping's power, from an understanding of leadership prior to his tenure. This is because it seems that while Jiang Zemin and Hu Jintao followed Deng Xiaoping's path of opening up, with an initial investment-driven approach but a gradual introduction of the market innovation-driven one, Xi promises to continue this market approach but acts in a different direction. Once the evolution of innovation from a Party-state perspective is understood, as well as its interaction with the private sector in this regard, one can truly assigned innovation a key role as a guarantee for the survival of the Chinese regime. The relevance of this topic increases if it is understood through the prism of a possible new legitimacy strategy, based on this idea of regime survival trough innovation.

II. PURPOSES AND MOTIVES

“There is no greater illusion than fear, no greater wrong than preparing to defend yourself, no greater misfortune than having an enemy.

Whoever can see through all fear will always be safe”

(Lao Tzu, chapter 46).

The aim of this thesis is to answer two different but connected research questions. Is the commitment to innovation a guarantee of survival of the Chinese regime? Furthermore, can innovation serve as a means of providing new legitimation for the CPC? Secondly, is the CPC carrying out a heightened strategic public intervention in the technology sector? And if so, can it be regarded as part of the construction of legitimation through innovation?

I would not have chosen this topic with the same pleasure and conviction had it not been for the Asian inquietude, and specifically about China, I have cultivated over the last five years of my career. An interest that undoubtedly began with my dad, who had on his chest the first letter of the ancient Japanese alphabet. An enjoyment that grew in university with Professor Javier Gil and his excellent introduction to the complexity of Asia. In the academic sphere, this continued with the reading of great books –*Wild Swans; China in Ten Words; The China Questions; Balzac and the little chinese seamstress*; or *The Tao Path*, among others–, attending several lectures (including assisting the *Cátedra China Awards 2022*), and countless academic articles, newsletters and think tanks that demystify and bring the region's reality closer to the West. This attraction materialized in the possibility of carrying out an academic exchange in Hong Kong, which finally blossomed thanks to the study of Mandarin during the last two years. This academic, experimental, and grammatical process has culminated in the certainty of the need to understand and decipher this complexity.

With more understanding, there is less fear, less confrontation.

III. FIRST PART. THEORETICAL APPROACH

“China is not a superpower, nor will it ever seek to be one”

(Deng Xiaoping, April 9th, 1974, Sixth Special Session of the United Nations General Assembly).

3.1. State of the art

Around the middle of the sixteenth century western clocks were introduced in China by the Jesuits missionaries. In China, clocks spread and were accepted faster than any other objects from the West, and it was part of the “clock diplomacy”, an attempt by the Jesuits to charm their way into the imperial court through gifts of advanced European technology (Kaijian, 2016). Once the European clocks won the favor of the Qing Dynasty’s Qianlong emperor -the Son of Heaven- local workshops burst force all over China to study and recreate the Western imports. They mastered the technique and began producing near exact replicas, constructing timepieces that embodied Chinese designs and cultural traditions (Lee, 2018). China’s own copycat clockmakers date back hundreds of years, but same cultural currents flow today.

In 2014, Regina M. Abrami, William C. Kirby, and F. Warren McFarlan published “Why China Can’t Innovate” in the magazine Harvard Business Review, an article that reflected at that time the prevailing attitude in literature towards the topic. Literature suggested that technological breakthroughs multiple in an environment of free speech, free markets, and democracy. In this regard, James Fallows (2009) argued that China's long-standing cultural tendency of copying and imitating the inventions of others, rather than producing original ideas, hindered its ability to innovate and create. Same author (2013) questioned the capacity of the next 30 years for China to show the same kind of progress towards a true rich country, and the hypothesis in its book was that it would be difficult to make the transition if stacked in the same political model. In addition, Daniel Bell (2010) defended that China's Confucian cultural tradition placed a high value on social harmony and stability, which could come at the expense of individual creativity and innovation, becoming a barrier to China's ability to compete in the global economy. Finally, Evan Osnos (2015) illustrated the heavy emphasis on rote learning and memorization in China's education system, which discouraged creativity and critical thinking, suggesting it contributed to a culture of imitation and copying instead of originality and innovation.

What all these authors had in common was the prevailing attitude in literature towards the inability of China to innovate. In conclusion, throughout the last decade many believed that the West was the birthplace to creative business and innovators, and that China was largely a land of rote learners subject to rules, a big copycat manufacture industry, and a place where R&D was diligently pursued but breakthroughs were rare. Even the products that emerged from China's cultural stew were widely mocked by the Silicon Valley elite. They were mocked as cheap knockoffs, embarrassments to their creators and unworthy of the attention of true innovators (Lee, 2018).

Furthermore, some authors like Abrami et al. (2014) shifted this inability position to one of possible but limited innovation in China, taken place from the top-down, from the bottom-up, through acquisition, and through education. So, even though the combination of different approaches translated into some successes, they raised the question of whether the Chinese potential to achieve technological dominance could be realized. They concluded that while China was benefiting from the so called latecomer's Schumpeter advantage, it did not lead because of the lack of an institutional framework that allowed the full emergence of the true spirit of entrepreneurship. Ultimately, "the problem, we think, is not the innovative or intellectual capacity of the Chinese people, which is boundless, but the political world in which their schools, universities, and businesses need to operate, which is very much bounded" (Abrami et al., 2014).

However, there is a shift on literature regarding the current state of innovation in China, few authors question the capacity of China to innovate, and outdated assumptions about its technology environment are no longer defended. It is even stated that the aforementioned authors missed that "the most valuable product to come out of China's copycat era wasn't a product at all: it was the entrepreneurs itself" (Lee, 2018, p.28). After missing first and second industrial revolutions, China wants to lead the third one. Currently, it holds more than 240 unicorns, and is the second country with the highest number of unicorns (Baltrusaitis, 2022). In addition, 8 of 10 companies that had reached a \$1 billion valuation in the shortest time are located in China (Dychtwald, 2021). Even more, China ranked the 1st in innovation economy by income group, the 3rd by region, and the 11th worldwide (out of 132 countries and) in the 2022 Global Innovation Index (up 23 places from ten years ago, remaining only middle-income economy in the top 30).

Furthermore, China has become a major trading partner for more than 140 countries and led the world in total volume of trade in goods, with an average rate of contribution to global economic growth of 38.6%. Lastly, in 2022 China surpassed the United States in annual peer-reviewed publication output and has as many top 100 S&T clusters (Lau, 2022). In conclusion, in the past twenty years, “China has transformed from a technological backwater into an innovation powerhouse” (Sheehan, 2023). Definitely, just copying is not enough to explain the current situation in China, where mere imitation is not enough for Chinese firms to survive and thrive; they need to iterate relentlessly to meet customer needs. For example, smartphone manufacturers came up with a mobile phone with seven stereo speakers for construction workers and another one that could last a month without charging for travelling salespeople (Li & Chen, 2022, p.32).

In addition, debates regarding China as a proper competitor were marked by “the notion that only democracy can promote innovation and creativity, that a market economy provides the only route to success, and that innovation derives from the private sector” (Weinstein, 2022). Currently, the China model aims to “defy persistent beliefs that an authoritarian regime cannot develop a competitive and innovative economy. If the CPC is successful, it will provide other countries with an alternative economic model based on a heavy involvement of the state” (Zenglein & Holzmann, 2019, p.20). When China entered the WTO in 2001, the West believed that it would eventually become a liberal democracy with a market economy, as Japan and South Korea did. Chinese economic growth was achieved, but its economic model did not converge with a Western one.

Therefore, the literature evolved in understanding the technological process in China, from manufacturing to cutting edge innovation economy, with major implications in terms of the role of democracy and market economy, and the combination of a private sector with heavy state involvement. This thesis aims to understand the role of the state in China's innovation process, which, as will be proven, serves as a survival strategy, and in recent years is more evident in the technology sector than in any others. Moreover, Feijj6 (2021) postulates that in 2017 a new form of China's international presence happened: technology acquired by and developed in China became its blueprint for leadership. Moreover, he proposes the political and social model underpins to return the Empire at the Centre (中国) to the place it has held for most of mankind history: most socially and technologically advanced nation.

Comprehension of the role of the Party-State in this technological process, mainly by the role of State-Owned enterprises and Golden Shares, will allow for an assessment of the country's *capabilities* to afterward analyze the *intentions* (as in Mearsheimer theory). The *intentions* behind this Strategic Public Intervention, whether or not it respond to a new narrative of legitimization.

That is so because this thesis aims to address the question of innovation in China (extensively covered in the literature) not only from a technological point of view (also extensively covered and identified as key to the country's economic growth) but also from an IR theory point of view, by linking it to the question of system legitimation. In terms of the gaps that exist and the aspects that remain to be addressed, literature widely discussed how China is achieving innovation, both technologically and as a major competitor that continues to grow, how it is defying all the parameters of a market economy, how is even leading in key sectors (such as high-speed trains or AI), and what the role of the party-state has been. What hasn't been that widely covered is how this role of the Party-state, which is more described than generally explained, can respond to an intention that does not begin with competing in the international arena (as many authors propose), but with guaranteeing its own survival within its borders.

3.2. Objectives and research questions

We have already mentioned both research questions of this thesis. Is the commitment to innovation a guarantee of survival of the Chinese regime? And is there a strategic public intervention in the technology sector to guarantee this survival and legitimation of the CPC? In order to answer, the following major specific objectives are to be followed:

- Has China moved beyond being just a copycat and become a true innovator on the world stage?
- When analyzing China's role in international relations, which theory best fits the country and why?
- What is the significance of innovation from both an International Relations perspective and within the context of China's goals?
- What does the concept of legitimacy and legitimation mean, and how can it be applied to understanding China's political landscape?
- Are there various types of innovation in China, and how do they contribute to the country's overall growth?

- What is the role of the CPC in Chinese innovation? For which it will be necessary to analyze: What are the polity features of the CPC? What does it mean to build China into a modern socialist country?
- In innovation in China a priority, and what has been the evolution of the country's National Innovation System over time?
- How has the Chinese government addressed innovation and technological development in both public discourse and policy?
- Does innovation differ across China's various regions and provinces?
- Is there a strategic intervention of the CPC in the private sector? For which it will be necessary to analyze: Who are the main actors in the technological private sector?; How does the CPC intervene in the private sector's technological development, and what is the nature of their interactions?
- Is innovation a strategy for providing new sources of legitimation for the CPC, and if so, what might these sources be?

And, to sum up, the main research question behind: The role of Innovation: a new source of Legitimation for the Communist Party of China.

3.3. Hypotheses

The main hypothesis of this thesis is that commitment to innovation of the Party-state is a guarantee for the survival of the Chinese Party-state political system. Since the founding of the People's Republic of China in 1949, the CPC has progressively given greater importance to innovation, with means that have varied according to the party line of each General Secretary, but with one great end, the survival of the regime.

3.4. Methodology

The study has been carried out by choosing a country, China; and a time, that of the People's Republic of China, since 1949. The chosen manifestations of action have been enough to identify a pattern, a repetitive behavior that allows, via induction, to establish generalizations about the issue under analysis. For this purpose, the analysis has been carried out using both primary and secondary sources.

3.5. Theoretical framework

3.5.1. Realism

International Relations (IR) theories studied are based on a Western framework, which can make them of limited application when it comes to not just predicting, but simply interpreting China's actions. However, “offensive realism offers important insights into China’s rise” (Mearsheimer, 2014), and it can be applied to understand the race for power, materialized in the race for innovation, that has characterized China in the last decades: the so called innovation-driven development. Behind this race could lie the need to legitimize the survival of the Chinese Party-State system. Furthermore, from a Chinese theory of IR, the Realist Theory can find a direct relationship with the approach of the Tsinghua School (Pintado, 2019, p.212). This approach represents the first indigenization -instead of relying on IR concepts imported from the West, Chinese scholars develop new ones by drawing on Chinese concepts- of China’s IR discipline (Zhang, 2012).

For offensive realism, the ultimate goal of every great power is to maximize its share of world power and dominate the system, and the key core assumptions are: states are key actors in IR; states have *capabilities* and *intentions*, easy and difficult to measure respectively; states rank survival as their most important goal; and states are rational actors, they maximize their chances of survival. The conclusion drawn is that “the more powerful a state is relative to its competitors, the less likely its survival will be at risk” and that “China is likely to follow basic realist logic and attempt to become a regional hegemon in Asia” (Mearsheimer, 2014).

In addition, the question of internal stability is particularly important in China because of the impact of China's so-called Century of Humiliation. That is because it is argued that it was internal weakness what facilitated foreign incursions, with Chinese power learning a bitter lesson that today marks the political future of the country: the main threat to the country's sovereignty and autonomy is not to be found outside but lies in its own internal stability. To maintain its own internal stability, the Communist Party will not hesitate to implement the necessary political actions (Gil, 2020, p.17-19).

In this line, on the 20th National Congress of the Communist Party of China (hereinafter, “Party Congress”), Xi Jinping talked about “put our national interests first”, “shown a fighting spirit and a firm determination to never yield to coercive power”, “safeguarded China’s dignity and core interests” and “ensuring security” (Xi Jinping, 2022). That is also why Premier of the State Council Li Qiang, when addressing the First Session of the

14th National People's Congress on March 13, 2023, defended the country "will keep to the general principles of prioritizing stability and seeking progress while maintaining stability", empathizing stability overall (Li Qiang, 2023).

Even more, one important body of thought in China is Marxism-Leninism, the official ideology since 1949. However, in the late 1970s, the CPC leader Deng Xiaoping set aside the Marxist-Leninist line of Mao Zedong, in favor of something more similar to state capitalism. Successors Jiang Zemin and Hu Jintao followed his approach, stretching the role of the market. Nonetheless, "Xi has brought that era of pragmatic, nonideological governance to a crashing halt" (Rudd, 2022). Like Marxist-Leninists, Xi constructs his thinking on "historical materialism (an approach to history focused on the inevitability of progress through ongoing class struggle) and dialectical materialism (an approach to politics that focuses on how change occurs when contradictory forces collide and are resolved)" (Rudd, 2022).

In this regard, it is important to mention that Deng Xiaoping discourse on April 6, 1974, on the Sixth Special Session of the UN General Assembly, stating that China was not a superpower, nor will it ever seek to be one, are no longer true. From an offensive realism perspective that ranks survival as the first priority, and the need to maintain internal stability, the CPC will not hesitate to implement the necessary political actions to conquer this scenario.

3.5.2. Innovation from an International Relations point of view and the case of China

In addition, it must be studied whether innovation plays a key role as a means to the survival of the state, and from a Realism IR theory point of view, what is the role attributed to it. In this realm, IR scholars have long recognized that technological innovation plays a key role in power transitions and international politics, but the field lacked an overarching framework to illuminate how dominant and rising states interacted, until Kennedy and Lim (2018) proposed the “innovation imperative” framework. Even more, “technology is becoming the most complicated and central challenge of international relations strategic competition, with implications for military, political, and economic power” (Center & Bates, 2019). Last but not least, the Schumpeterian approach, in contrast to institutionalism, “argues that a country’s catch-up process is closely linked to technology development or acquisition” (Liu, Schwaag, Tagscherer and Chang, 2017, p.657). Is a matter of finding an appropriate and sustainable new development model for China.

According to Kennedy and Lim (2018), economists once believed that the gap between wealthy and developing economies would close as growth was seen as a result of capital accumulation that is subject to diminishing returns. Currently, IR scholars understand that convergence is not guaranteed and developed economies may maintain their advantage through innovation, which improves the efficiency of how capital and labor are utilized and has the potential to avoid diminishing returns. Therefore, innovation has become a crucial factor for the economic success of developed nations. This implies that emerging economies face a greater challenge than previously thought by IR scholars. It is not enough to rely on the diminishing returns of developed nations to catch up, they must also become more efficient through innovation (p.555).

In this regard, acknowledging the innovation imperative translates into considering “the technology and innovation arena act as a unique locus of Great Power interaction” (Kennedy and Lim, 2018, p.557), even more, “what makes the innovation domain theoretically and empirically interesting for IR scholars is its external effects, bringing matters associated with political economy into broader questions of security, hegemony and order” (Kennedy & Lim, 2018, p.557).

This is particularly crucial for middle-income nations that have that have passed the first stage of industrialization, such as China. Further capital investment in these nations faces decreasing returns, while rising wages make it difficult to compete on previous low-cost labor, causing export industries to suffer. This is commonly referred to as the "middle-income trap". That's why it is necessary the dynamic of the innovation imperative: "it is widely recognized that middle-income economies need to upgrade the technological sophistication of their economies, among other things, to enjoy continued long-term growth" (Kennedy and Lim, 2018, p.556). The challenge for the rising power is to develop a strategy to acquire these technologies from the advanced wealthy states that developed them, that specifically for hard to get technologies in China manifested in attracting, acquiring, or attacking these technologies (Zenglein & Holzmann, 2019).

Regarding the middle income trap in Chinese economic data, the main idea is that China is growing economically again after being heavily impacted by Covid-19. It is growing, but it is no longer the world's factory, it has changed from low to high value and has focused on the services sector. Since China began to open up and reform its economy in 1978, GDP growth has averaged over 9% a year (World Bank, 2022). In the face of the cyclical and structural headwinds, "China's growth in 2022 is expected to be below global growth for the first time in over 40 years" (International Monetary Fund, 2022, p.4).

Even more, "China's GDP growth in 2022 is estimated to have been about 3%, the worst since 1976 (apart from 2020's 2.2%), when the Chinese economy shrank by 1.6% after the death of Mao Zedong" (Liu, 2023). However, "the experience of other countries suggests that recent slowdown was to be expected at China's current level of income. Only a few economies maintained growth rates around 7 percent for another decade after reaching China's current per capita income level" (WB & DRC, 2019, p.17). In this sense, China's growth is expected to slow after the reopening boost (see [Figure A](#)).

To overcome the middle-income trap, it appears that instead of a significant increase in stimulus efforts, the focus will be achieving an innovative development, with high quality growth and efficiency. As a result, "Chinese government leaders and scholars have defined a new paradigm for the future of China: innovation-driven development" (Liu et al., 2017, p.657).

The Innovation-Driven Development Strategy is a comprehensive plan under the Xi administration, aimed at achieving China's ambition of becoming a global superpower by

mid-century. The strategy is centered around state direction, but with market support, global engagement and techno-nationalist motivations. Its objective is to promote technological innovation across the nation, utilizing a selective authoritarian mobilization model that Xi regards as the superiority of the socialist system. This approach has proven successful in several critical science and technology initiatives in the past (Ming Cheung, 2022, p.167).

The reasoning behind this decision is threefold. Firstly, due to tight control policies, China's savings have been depleted without consistent and high-quality production, resulting in a lack of capital for immediate economic expansion. Secondly, policymakers are wary of financial risks associated with massive stimulus, as it may be exploited by speculators in areas such as fintech, stock markets, real estate, and banking. As a result, tighter oversight and interventionist measures are deemed necessary. Finally, with Beijing choosing to "live with the virus," the government must balance epidemic prevention with economic development (Zhou, 2022).

Once the importance of innovation to the economic success of a developed nation has been established, and why China would focus on high-quality growth and efficiency, we need to look at how China is doing it. In IR, the approach to economic prosperity is thought to be emulating the strategies of developed nations, a recipe for success that mean investing in skills, production capacity, and design technologies. Regarding technology, an alternative theory called “leapfrog” is key to understand China. Leapfrogging “occurs when a nation bypasses traditional stages of development to either jump directly to the latest technologies (stage-skipping) or explore an alternative path of technological development involving emerging technologies with new benefits and new opportunities (path-creating)” (Yaboke, Crumpler & Carter, 2020).

This is important because most observers write off China’s innovation strategy as the result of “leapfrogging”, clearly visible for example in the high rates of mobile-payment adoption (Dychtwald, 2021). Technology and realism perfectly interact in Xi Jinping’s discourse at the 20th Party Congress, where the need to achieve greater self-reliance and strength in S&T was constantly repeated.

Leapfrogging is part of this economic development through high quality growth and efficiency, and definitely part of the innovation-driven development new paradigm. Specifically, regarding the contributions to global development made by China in relation

to the innovation ecosystem, Xi Jinping identified at the 19th Party Congress: electronic commerce, mobile payments, shared bicycles and high-speed trains (Feijoo, 2021, p.136). But how can innovation (创新) be understood in the case of China? Does it have its own particularities?

According to Tai Ming Cheung (2016) there are three types of innovation that the Chinese leaders emphasize. First, Original Innovation (原始创新). Defined as scientific discovery producing novel output with global impact and being the foundation of the innovation ecosystem and the long term goal. In this category we only find the hybrid rice, the only original global innovation from China according to Cheung (2016). Is the most important one, and that is why when quick research is made in Baidu (Chinese Google), it is defined as: "Original innovation is the most fundamental innovation, the innovation that best embodies wisdom and an important manifestation of a nation's contribution to the progress of human civilization".

Second, Integrated Innovation (集成创新). Defined as tight integration of research and development with design, manufacturing, and marketing/doctrine to produce better products, being what enacts the core of architectural innovation. The technology is not brand new, but when linked with design, marketing, and output side it has a much more revolutionary impact. "Integrated" means to concentrate and combine the good and essential parts to achieve the overall optimum effect. Integration is not simply connecting, mixing, converging or grouping, but creatively fusing various innovative elements so that they complement and match each other. In this way, the innovation system undergoes a qualitative change, forming unique innovation capabilities and competitive advantage (Cheung, 2016).

Third, and the most prominent one last years, Re-Innovation (再创新). Defined as Introduce, Digest, Assimilate and Re-innovate (IDAR) imported technologies.

The perfect example for this category is the high speed train. In the early 2000s China was able to import German, Canadian, French and Japanese technologies, and in a few years it developed its own high-speed train system, becoming a current world leader in the field (Zenglein & Holzmann, 2019, p.21). Hu Jintao's (2012) speech at the 18th Party Congress perfectly reflects the three types: "We should increase our capacity for making

Original Innovation and integrated innovation and for making further innovation on the basis of absorbing advances in overseas science and technology, and place greater emphasis on making innovation through collaboration”.

The combination of these three types of innovation is what it was first mentioned as “Indigenous Innovation” (自主创新) in the MLP (2006-2020). According to the Plan: “Indigenous Innovation refers to enhancing Original Innovation, Integrated Innovation, and Re-Innovation based on assimilation and absorption of imported technology, in order improve our national innovation capability” (State Council, 2006, p.9).

3.5.3. Legitimacy and legitimation

In addition, the Chinese System faces an additional but widely connected challenge to that of being subject to the middle-income trap, the one of how to guarantee the survival and hence the legitimacy of its Communist Regime. In this regard, “no question is more fundamental to a political regime’s stability and survival than that of popular legitimacy. In the eyes of its people, does the regime in power have a right to rule?” (Perry, 2018, p.11). In addition, Szonyi (2018) identifies that one of the big challenges that China, and in particular the Chinese government, faces in the future is: Can the CPC retain its legitimacy as its revolutionary origins become less and less relevant? (p.7).

The question of legitimacy is a complex one. That is so because legitimacy is a ‘soft’ category within the social sciences, prone to change over time and difficult to operationalize. In addition, it is even more complex in the Chinese system. In order to conduct an analysis on legitimacy, we are going to focus on Max Weber’s construction on legitimacy, as well as the proposed framework of Peter Sandby-Thomas, to link it later on the analysis with the Chinese context.

Max Weber defended that a legal system was legitimate if those subject to the system have made a value judgment that the laws promulgated by the system ought to be obeyed. Max Weber identified three basic sources of regime legitimacy: traditional, charismatic and rational-legal. In traditional type, people obey the state’s dictates because it is customary to do so. Weber pointed to Imperial China as an archetypical example. The revolution of 1911 shattered its traditional legitimacy. In the charismatic type, popular obedience derives from devotion to the supreme leader. Mao’s China can fit this category,

since he was the leader of the Communist Revolution that restores Chinese sovereignty. His death in 1976 closed the chapter on charismatic legitimacy. Lastly, the rational-legal type defends that modern democracies, impersonal laws and bureaucratic administrative procedures are the basis for citizens compliance. Few authors would support that China's long history of authoritarianism has rational-legal legitimacy prevailed and is even harder to defend in Xi Jinping's era, where power has been recentralized in the leader (Perry, 2018, p.11-12).

If none of Weber's traditional types of legitimacy apply to contemporary China, how to explain that more than forty years after Mao's death and nearly thirty years after the fall of communism across central Europe a communist regime remains firmly in place? Perry (2018) points out that struggling to explain regime sustainability in contemporary China, "several scholars, including Dingxin Zhao and Yuchao Zhu, have suggested that the PRC survives only by virtue of an instrumental 'performance legitimacy' derived from the impressive economic growth of the post-Mao period" (p.13).

The question is particularly relevant for contemporary China, were a slowing economy, as we have already mentioned (see [Figure A](#)), threatens to crumble the great accomplishments of recent years. Perry (2018) raises some important questions in this regard: Will political support under conditions of adversity spell the downfall of the regime? Or does the Chinese communist regime command a level of popular legitimacy that may allow it to withstand the substantial domestic and global challenges? Moreover, the question of legitimacy of the CPC has been widely discussed in literature. In Schubert (2008) article *One-party rule and the question of legitimacy in contemporary China*, three principal contributions to the study of the CCP's legitimacy can be withdrawn.

The first contribution is to criticize "Western *academe*" for the widely held view that the end of the CPC rule is inevitable. It is proposed that in the case of the PRC, the interlock of the system's legitimacy with that of the Party means that power has not been fully institutionalized and so results in a less stable system. However, "acknowledging the fragility of the PRC's political system does not mean that the CPC necessarily lacks legitimacy" (Sandby-Thomas, 2014, p.577). In addition, the problem lies on taking a normative view of legitimacy in which regimes are judged "against a set of prescriptive criteria, such as the protection of individual human rights and levels of civic participation.

In this, the position of the analyst is privileged by determining legitimacy in terms of what it ought to be” (Sandby-Thomas, 2014, p.577).

The second contribution proposes the possibility of the CPC generating legitimacy over the course of the reform process. Indeed, “the Chinese political system is able to generate significant degrees of regime legitimacy by adapting rather successfully to a changing domestic and international environment” (Schubert, 2008, p.193). In this regard, an analytical view of legitimacy is supported, in which particular regimes are assessed using measurements of popular support, being the views of people privileged by determining legitimacy in terms of what it is.

The third contribution is to conduct research on the legitimizing effects of political reform at the micro-political level. In this regard, it helps to move the debate on the CPC’s legitimacy beyond the classic formula of economic performance, nationalism and communism, since Schubert argues this formula does not fully capture the complexity of the CPC’s legitimacy (Sandby-Thomas, 2014, p. 579).

Lastly, and the framework we adhere to in this thesis, is to suggest that legitimacy does not constitute the most appropriate conceptual framework in which to present our research. In particular, and as argued by Sandby-Thomas (2014), a better conceptual framework would be the one of legitimation, different from legitimacy. Even though the two concepts are often used indistinctively, Sandby-Thomas (2014) proposes that while legitimacy is “a static property external to a political system”, legitimation is “a dynamic process essential for a political system, and since it’s an activity, it involves creation, modification, innovation, and transformation” (p.585).

Therefore, governance reforms are no longer measured in terms of the CPC’s overall legitimacy, but are analyzed as part of the regime’s various attempts at legitimation. In this regard, the problem that arises therefore is to identify not the sources of legitimacy, but rather of legitimation. If legitimation is an activity, we can only identify it on a specific context, and based on specific attempts, that in our case is the context of Xi Jinping’s China and the attempt of an innovation-driven strategy.

To sum up, we can begin to comprehend China's pursuit of innovation within the theoretical framework of offensive realism that defends states act primarily for their survival. Also within the innovation imperative, that as well as explaining why the middle

income trap can't be surpassed without innovation, proposes its external effects bring matters associated with political economy into broader questions of security, hegemony and order. And lastly within a legitimation framework, through which we will later analyze how to understand Xi Jinping's China.

3.6. Structure

The thesis is structured as follows. Firstly, it provides a contextual understanding of the CPC's role in China's innovation process. This includes an analysis of the party state polity features, the meaning of Building China into a great modern socialist country, the relationship between the Populist Coalition and the Elitist Coalition, the evolution of the National Innovation System, Party State policies, and regional innovation poles in China. Secondly, the thesis analyses the CPC's public strategic intervention in the technology sector. This includes an examination of the key private players in the technology sector and how the CPC interacts with this sector. Thirdly, the thesis explores whether innovation in China is a response to a new form of legitimation for the Communist Party of China.

Finally, a series of conclusions, answering the hypothesis posed, the mains results and findings, establishing possible limitations, and defining the conclusions and policy avenues in general terms.

IV. SECOND PART. CONTEXT, ANALYSIS AND DISCUSSION

4.1. Context. Role of the CPC in Chinese innovation

“We must regard science and technology as our primary productive force, talent as our primary resource, and innovation as our primary driver of growth”

(Xi Jinping, October 22, 2022, 20th National Congress of the Communist Party of China).

4.1.1. Party-state polity features

Because the role of the State in innovation is going to be the main focus of the dissertation, it is adequate to make a brief introduction of China’s Political System. China’s polity is a Party-state, with the Communist Party of China leading China since Mao Zedong established the People’s Republic of China on October 1st, 1949. How the CPC exercises its leadership is not straightforward, and China’s Party-state polity features interlocking Party and state hierarchies. A two focus approach is going to be conducted, one from the Party level, another from a state one.

The Party’s top national-level institution elected every four years by the CPC of the Party Congress, the former celebrated October 2022 (the 20th), “is the Central Committee, led by a General Secretary and including an elite 25 person Political Bureau (Politburo) and even more elite 7 person Politburo Standing Committee” (Congressional Research Service (CRS), 2021, p.2). The Central Committee’s voting members elect the General Secretary, the Politburo Standing Committee, and the Politburo; it ratifies the Party’s choices for members of the CPC’s Central Military Commission and approve the Politburo Standing Committee’s nominations for the Party Secretariat (CRS, 2021). The composition of the CPC hierarchy in numbers for the 19th Party Congress is included in [Figure B](#).

As in 2023, at the top of the hierarchy of the CPC is Xi Jinping, that studied chemical engineering at Tsinghua University, and whose father was Xi Zhongxun, one of the founding fathers of the CPC. Xi Jinping first assumed the position of General Secretary of the Central Committee at the 18th National Party Congress in 2012 and was reelected to a second five-year term at the 19th in 2017, and at the 20th in 2022, breaking the two-term limit for top leaders established by Deng Xiaoping.

It is even said that no PRC leader has seized such power, or such a cult of personality, since Mao Zedong. Chosen for his knowledge and his loyalty, with his speeches evoking traditional Chinese culture, morality and the supremacy of authority, it is not difficult to perceive Xi as the embodiment of a new emperor in the heavenly realm (Feijoo, 2021, p.117). To refer the entirety of Xi Jinping's tenure as General Secretary official statements have used the term "New Era", closely associated with Xi in Chinese official discourse. This association began at the 19th Party Congress in 2017, where Xi mentioned the "New Era" 46 times in his introduction speech, marking a major historical shift (CRS, 2021).

The state consists of several hierarchies. The national-level institutions in each hierarchy are: “National People’s Congress, China’s unicameral legislature; State Council, China’s government cabinet; National Supervisory Commission; Supreme People’s Court; Supreme People’s Procuratorate; and the National Committee of the Chinese People’s Political Consultative Conference” (CRS, 2021, p.2). The 14th National People’s Congress first session took place on March 13th, 2023, and along with its Standing Committee promised to thoroughly implement the guiding principles of the 20th Party Congress. The composition of the National People’s Congress in terms of General Offices, Working Bodies and Special Committees is included in [Figure C](#).

4.1.2. Building China into a great modern socialist country

In China, innovation has been essentially a sectoral policy, rather than a territorially focused one, being the national level central to understand innovation policy and practice in China. The policy agenda is set by central government, in particular: the National Development and the Research Commission; in the State Council the Ministry of Science and Technology, Ministry of Commerce, and the Ministry of Economy; and the Central Committee for the Comprehensively Deepening the Reform (Hassink, Liu, Jensana, & Martínez-Taberner, 2020, p.25). In addition, “the strategy of innovation-driven development was first mentioned in China’s 12th Five Year Plan, which was released in 2011” (Liu et al., 2017, p.664), and hence when Hu Jintao was still General Secretary.

We have already mentioned the different types of innovation in China: Original, Integrated and Re-Innovation. However, in terms of a Party-state perspective, what do the chinese authorities mean by innovation? Is there any link with technology?

The starting point is the “search for a new development model”, Xi Jinping mantra since he became General Secretary in 2012. In this regard, in the Speech of the 20th CPC National Congress (hereinafter “the Speech” or “the Report”), when talking about the issues faced last decade, the General Secretary identified as one of the main ones that “development was imbalanced, uncoordinated, and unsustainable, and the traditional development model could no longer keep us moving forward” (Xi Jinping, 2022). That is why one of the essential strategic measures adopted by the Party over the last decade was to “fully and faithfully applied the new development philosophy on all fronts, focused on promoting high-quality development, and worked to create a new pattern of development” (Xi Jinping, 2022).

In this regard, the CPC defended the new development model by carrying out a supply-side structural reform, a series of major regional strategies important to China’s overall development, and a historic rise in China’s economic strength. Among the supply-side structural reforms was accelerating efforts to build self-reliance and strength in S&T, with nationwide R&D spending as the second highest in the world. However, Xi (2022) stated that imbalances and inadequacies in development remain currently a problem: “there are many bottlenecks hindering high-quality development, and China’s capacity for scientific and technological innovation is not yet strong enough” (p.12).

To overcome bottlenecks and pursue stronger innovation, considered the primary driver of growth, the Report includes a section titled “III. The New Journey of the New Era: Missions and Tasks of the Communist Party of China”. In this chapter, the Second Centenary Goal is set: building China into a great modern socialist country and great rejuvenation of the Chinese nation, having the First One –building a moderately prosperous society in all respects– been achieved according to Xi. Modernization means, in the short term, a series of development objectives for the year 2035: increase economic strength; increase scientific and technological capabilities; rank the world’s most innovative countries; great self-reliance and strength in science and technology; and building a modernized economy.

Throughout the whole Report, the idea of achieving greater self-reliance and strength in S&T (科技自立自) is constantly repeated, conceived as the primary productive force.

Investment in S&T and reducing the reliance on foreign technology is hence a matter of national security, and a key priority of the CPC. Furthermore, in order to build China into

a great modern socialist country, both “pursuing a High Quality Development” and “Invigorating China through Science and Education” are needed, and the most distinct trend to emerge out of the Congress is a clear prioritization of security concerns over all other issues.

In foreign policy, Xi's thought has led to the transition from Deng's “hide your abilities and buy time” to “show power, your time is now”. In the Speech, Xi highlighted what are, in his opinion, the three great milestones of his decade in power: the "entry of socialism with Chinese characteristics of the New Era", the thought that bears his stamp, and that could be elevated to the heights of Maoism; the centenary of the founding of the Communist Party of China, celebrated in 2021; and the culmination of the First Centenary Goal, which opens the door to new goals. Even more, in 2018, "Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era" was enshrined in China's constitution, hence cementing its legacy. To that end, the CPC is using technology to ensure that the espoused creed is reviewed and practiced each day, through the Study (Xi) Strong Country app (see in [Figure D](#) a screenshot of the app). Every day the application presents content related to the doctrine of President Xi and after the mandatory review, you have to answer a questionnaire about it whose results are sent to the Central Committee (Feijoo, 2021, p.118).

4.1.3. The Populist and the Elitist: a new scenario

It's important to highlight two almost equally powerful coalitions that represent different social and geographical divisions in China: The Populist and The Elitist Coalitions. It is important by virtue of the new composition of the Politburo Standing Committee following the 20th Party Congress, where Xi Jinping concludes the process of centralizing power around his figure as 4 out of 7 of its members were replaced with Xi loyalists.

The Populist Coalition includes the Tuanpai (leaders who moved up through the Chinese Communist Youth League, Hu Jintao's power base), Party Functionaries (Red Team) and Rural Leaders (Red States).

The Coalition is focused on social cohesion, regional development, and a people-centred rhetoric, concerned with social factors, migration patterns and the urban poor. In contrast, the Elitist Coalition includes the “Princelings” (children of high ranking officials), the “Shanghai Mafia”, entrepreneurs and capitalists, Returnee's (foreign educated Chinese

nationals, or what the Chinese call the ‘sea turtles’), and Urban Leaders from the coastal region (Blue Team). The Coalition is more focused on economic efficiency, coastal development, and rapid GDP growth, representing the interests of entrepreneurs and the emerging middle class (Cheng, 2009).

How are these Coalitions represented after the 20th CPC Party Congress? Xi Jinping is an Elitist (he is a “Princeling” since his father was one of the country’s revolutionary leaders), and he “packed the CCP’s top leadership with his most loyal allies, evicted all remnants of factional opposition, and established complete control over the Party and the country” (Asia Society, 2022). Probably since Mao Zedong, XI Jinping is the Chinese leader most tempted by ambition. In addition, Hu Jintao’s *protégés*, leaders whose careers advanced largely through the Communist Youth League ranks, faced not only diminished representation, but the Politburo does not include any Tuanpai leaders. Since Xi was appointed as General Secretary at the 18th Party Congress in November 2012 – and later simultaneously as Chair of the Central Military Commission and President of China in early 2013 – he has rapidly concentrated power into his own hands.

To summarize, the recent PBSC lineup suggests that Xi has eliminated any remaining factional opposition in the party, rendering discussions about traditional factional groups irrelevant. The times when there was a distinct "Shanghai Gang" centered around Jiang or a "Communist Youth League Faction" linked to Hu Jintao are now definitively over. This was highlighted during the 20th Party Congress when, whether intentional or not, the supposedly sick Hu was escorted out of the event just before Xi's new Politburo was announced (Asia Society, 2022).

The importance for our research of this new composition lies on the fact that financial markets were disappointed, with Chinese stocks experiencing the deepest daily fall since 2008, after the closing of the 20th National Congress. While the re-election of Xi Jinping was widely expected, what markets didn't expect was that Xi's PBSC is now only composed of his supporters (La Posta, 2023).

But why is that? What is the impact of the new composition of power in the CPC in the private technology sector? First, most of the market-reform-oriented members of the Party’s top economic experts have retired or been shuffled off, including: Premier Li Keqiang –experience in one of the earliest industrialized provinces (Liaoning in the north), and leading member of the Chinese Communist Youth League–; Vice Premier and

“economy star” Liu He; central bank head Yi Gang; banking regulator Guo Shuqing; and Minister of Finance Liu Kun. Moreover, this could leave He Lifeng, the expected new Vice Premier in charge of the economy, with an outsized role. He is known to be a vocal supporter of Xi's favored strategy of economic nationalism, which includes his security-oriented "self-reliance" initiatives and the "Common Prosperity" drive to reduce inequality and promote cultural harmony by reining in aspects of the private sector by cracking down on elements of the private sector (Asia Society, 2022).

Second, Li Qiang, Xi's chosen *protégé*, in one of his first public interventions after being promoted to the top of the Party, even if he praised the "irreplaceable role" of private companies, he also encouraged the sector to "strive" to promote such high-quality development and technological independence always "under the guidance of Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era" (Li Qiang, 2023). Xi has made it clear that the trend is going to be towards greater control of the private sector, and everything seems to indicate that Li will respect the path. In addition, some of the coming restructuring will also serve to strengthen the construction of the Party within private companies (Abril, 2023). Hence, the increasing role of the State in the private sector is already visible.

Additionally, a considerable number of individuals with experience in the defense industry or military-related S&T state firms or agencies, such as Ma Xingrui, Zhang Guoqing, Yuan Jiajun, Chen Jining, Li Ganjie, and Ding Xuexiang, have been appointed to the Politburo. This suggests that a significant portion of the Politburo consists of techno-nationalists who are committed to Xi's pursuit of technological and economic self-reliance, as well as the decoupling of China's supply chains in key areas (Asia Society, 2022).

4.1.4. Evolution of the National Innovation System

The innovation model in China is a catch-up model, seeking to move up to the already mentioned Re-Innovation, to Integrated Innovation, to Original one. In this sense, one of the main 6 challenges identified in the Report of the 20th Party Congress is “a change in innovation capability from the current situation in which China is “catching up, pulling even, and taking the lead” but is mainly “catching up,” to a situation in which China is

mainly “pulling even” and “taking the lead”. The CPC has published a whole set of initiatives to achieve this objective, initiatives that will be briefly mentioned next section as a starting point. Whether these policies are able to qualify China to achieve Original Innovation is an unknown scenario. However Cheung (2016) proposes that since China doesn’t have another choice, especially with the shift to a new development model, the authorities are willing to do whatever is necessary to reach that scenario.

From the 20th Party Congress report, one could argue that Xi, and hence the CPC, understands innovation as achieving both greater self-reliance and strength in S&T, breakthroughs in core technologies in key fields, and overall as a primary driver of growth and modernization. In addition, there is a strong coherence in the ideas of the 18th, 19th and 20th Party Congress reports regarding innovation and technology. In 18th (2012, Hu Jintao), the term “innovation” was used 38 times and the term “tech” was used 25 times; in 19th (2017, Xi Jinping), it was used 24 times and 25 respectively; and in 20th (2022, Xi Jinping), 29 times and 49, mainly doubling the appearance of technology.

By 2035, according to the Report, the country will have made "a substantial leap" in "economic-scientific-technological power"; by 2050, China will have been transformed "into a powerful, prosperous, democratic, civilized, harmonious and beautiful modern socialist country", and would be “leading in international influence”. In the balance of power, the General Secretary sees China as a future winner, mainly due and thanks to science and technology: “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” (Xi Jinping, 2022, p.21).

However, this has been the approach from the 20th Party Congress, but we have to study what has been the CPC's historical approach to innovation, where three distinct periods are identified. Liu et al (2017) propose two differentiated stages, a National Innovation System (hereinafter “NIS”) 1.0, and a NIS 2.0. We propose in this paper a third stage as a result of Xi Jinping's leadership, especially from his second and current third term, called NIS 3.0, that is indeed a return to the first period.

In NIS 1.0 period, that goes from 1980s to 2013, China's innovation system was heavily centralized, a top-down process, with the government dictating the industries, actors, and areas to be prioritized for development. China’s interventionist approach to economic

development has been called the Beijing consensus, to underline its deviation from the Washington consensus (where the role of the state was minimum). It's top-down catch-up process consisted of: Investments in S&T; National programs for S&T and innovation development; Focus on state-owned enterprises; Attracting foreign direct investment to increase knowledge transfer and innovation capability; and Focusing on high-tech industry and zones (Liu et al., 2017, pp.658-661). In this period, an investment-driven model propelled the economy from a low-income to a middle-income country, and S&T were assigned as crucial importance in driving the economic development, with Deng Xiaoping in 1995 speaking of S&T as the first productive force (Liu et al., 2017, p.658). It was the epoch of the technocrats, people with engineering or natural science backgrounds, that dominated policymaking in the 1990s and early 2000s.

In NIS 2.0 period, that begins in 2013, the starting point is the already mentioned 12th Five Year Plan in 2011, where the strategy of innovation-driven development was first mentioned. Liu et al. (2017) proposed this scenario "might become version 2.0 of the innovation system" (p.657), and they identify a series of benchmarks to this approach, but it is not concluded that the shift has actually taken place. In this regard, they recognize a gradual shift from heavy-handed top-down policy towards a more market-oriented approach and less technology driven, emphasizing instead the importance of creating better institutional conditions.

Some of these examples are a regulatory and tax reform, such as the Company Law passed in 2014 lowering the threshold for registering a company in China, and only in 2017 more than 6 million new companies were founded, three times more than in 2010 (Feijoo, 2021, p.45).

A central element is to distinguish between the government and the business sector, from government as driver or planner of innovation toward a role for government in ensuring suitable conditions for bottom-up innovation. While resource allocation shall be determined by market forces, the government sees its own new role in removing obstacles for innovation, seeking to transition from an investment-driven model to an innovation-driven model (Liu et al., 2017).

However, regarding this approach we see considerable challenges in the transition. First challenge is for the CPC to be willing to change from being a technocrat and S&T planning organization to becoming an innovation facilitator, and to even consider if that

is favorable. The greatest resistance “is likely to come from mid-level officials who are more familiar with and incentivized by the plan-based economy than free market thinking” (Liu et al., 2017, p.666). Secondly, promoting a favorable environment for innovation will be more difficult than managing S&T projects in a system that is used to allocating funds. Thirdly, private firms, particularly S&M firms, continue to be discriminated against in access to financing, land, certain markets and government contracts, but also involvement in policymaking.

Liu et.al (2017) also identify an obstacle to NIS 2.0 the continued preference for Indigenous innovation or techno-nationalism as opposed to international cooperation among policy makers. In this regard in 2014 Xi Jinping reiterated the importance of Indigenous innovation, that might be seen as a return to a more protectionist Chinese economic policy (p.667).

That’s why we defend the current state of innovation in China can be called NIS 3.0, that is pretty similar to a NIS 1.0 that wasn’t able to actually evolve to the 2.0 scenario. In 2017, Liu et al. wrote about the composition of technocrats in the different generations of CPC leaders the following: the fifth-generation political elites, born in the 1950s or later, represent a departure from their predecessors in the third and fourth generations, with a decline in the influence of technocrats and a rise in the influence of leaders trained in economics, social science, and law. This shift in leadership could explain why former President Hu Jintao and Prime Minister Wen Jiabao prioritized S&T as drivers of innovation, while President Xi Jinping and Prime Minister Li Keqiang placed greater emphasis on markets, entrepreneurship, and institutional development as critical factors for enabling and driving innovation (p.664).

However, as we have already mentioned regarding the composition of the new PBSC after the 20th Party Congress, Le Keqiang is no longer part of it, as most of the market-reform-oriented members of the Party’s top economic experts, that have retired or been shuffled off. In this regard, even if Xi Jinping promoted this emphasis of markets, its third tenure as General Secretary started on the opposite direction. In this same sense, Feijoo (2021) identifies that as a result of Xi's second term as of the 19th Party Congress, this new model, strongly supported by techno socialism, began to be established (p.46).

4.1.5. Party-state policies

Innovation, and in particular technological development in the Country –identified as crucial to economic growth– is driven by long-term five-year plans. The first of these plans was presented in 1953, because until then it followed a system of central planning patterned after the Soviet system. We identify in total fourteen five year plans, being the 13th and 14th specially important to understand the progressive shifts in the country's economic growth model. However, to specifically understand the innovation-driven model in China is more convenient to focus on the following policies: the National Medium-and Long-Term Plan on the Development of Science and Technology (2006-2020); Made in China 2025 (2015-2025); and the National Innovation-Driven Development Strategy (2016-2050). Policies that, although its particularities, have in common: the acquisition of new technologies for their implementation in Chinese industry, Indigenous Innovation as a means to achieve world leadership, and protectionism as a way of defending Chinese industries against the international market.

The National Guideline for Medium- and Long-term Plans for Science and Technology Development (2006-2020).

February 9, 2006, the State Council presented a plan to strengthen China's S&T progress in the consequent 15 years. It was China's first long-term plan in the new century, first since becoming a member of the WTO, and first since President Hu Jintao and Prime Minister Wen Jiabao came to power in 2003 (Schwaag-Serger, 2007). It set its intention to transform China into an innovative society by 2020 and a world leader in S&T by 2050 (Abrami, Kirby & McFarlan, 2014).

In the official text, the word “innovation” is mentioned nearly 300 times. In particular, and introducing a new direction in China's policy, the Plan recognized the need to reduce China's dependence on foreign technology, adopting for the first time the phrase “Indigenous Innovation”, raising also for the first time and concurrently ever since, concerns abroad over the rise of “techno- nationalism” or “neo-techno-nationalism”, focused entirely on advanced technologies (Liu et al., 2017, p.658).

The most important aspects can be summarized in three points. First, China will increase R&D expenditure as a share of GDP. Second, China will strengthen domestic innovative capacity and reduce dependence on foreign technology to less than 30% (at the time being 60%). Third, enterprises and the business sector will be the central driving force of the innovation process. Beijing's plan is a technology-oriented growth strategy placing

priorities on energy, water supply, environmental technologies, mastering core technologies in IT, services, and production technology (such as processors and software), catch up in selected areas as biotechnology, national defense, and to strengthen both basic and strategic research” (Schwaag-Serger, 2007).

The culmination of the plan was the identification in October 2010 of seven "strategic emerging industries" that were regarded as vital for the Country to achieve mastery in if it was to become an advanced economy (Kennedy, 2015). To conclude, as with previous plans, this one was strongly supply-driven and assumed innovation could happen from above, top-down approach. Indeed, “markets and customers— important catalysts driving the innovation process—are hardly mentioned” (Schwaag-Serger, 2007, p.161).

Made in China 2025 (2015-2025).

May 2015 the State Council presented Made in China 2025 (中国制造 2025), an industrial policy blueprint, to build a world class innovation system, comprehensively upgrade Chinese industry, and achieve global dominance in key technologies. More “a guiding master plan than a concrete instruction, the strategy has been and is constantly being adjusted to newly emerging challenges. Yet, the long-term objectives of upgrading national tech capabilities and of creating opportunities for technological leapfrogging remain unchanged” (Zenglein and Holzmann, 2019, p.20).

The ten targeted industrial sectors are: next generation IT; high-end computerized machines and robots; aerospace and aeronautical equipment; maritime equipment and high-tech shipping; advanced railway transportation equipment; new-energy vehicles; energy equipment; agricultural equipment; new materials; and biomedicine and high-performance medical equipment.

However, these core industries are clearly not all pursued with the same intensity (see [Figure E](#)). With MIC25, “it has become apparent that China is prioritizing efforts in emerging industries and other fields conducive to the country’s digital and high-tech ambitions, especially in areas related to next-generation IT and materials” (Zenglein and Holzmann, 2019, p.21). China has already made significant strides in areas such as 5G networks (next-generation IT), highspeed railways (advanced railway transportation equipment) and ultra-high voltage electricity transmissions (energy equipment).

Nonetheless, “critical weaknesses have yet to be overcome, in particular, regarding the development of home-grown foundational technology, most notably in advanced semiconductors” (Zenglein & Holzmann, 2019, p.21).

In this regard, we can question if MIC25 is only an extension of MLP. Kennedy (2015) argues that MIC25 is different in multiple respects: The policy under consideration has several distinctive features. First, it covers the entire manufacturing process, not just innovation. Second, it aims to promote the development of both advanced and traditional industries, as well as modern services. Third, while the state still plays a role, the policy places greater emphasis on market mechanisms, aligning with the NIS 2.0 scenario. Fourth, the policy sets out specific measures for innovation, quality, intelligent manufacturing, and green production, with clear targets for 2013, 2015, 2020, and 2025. In addition, the plan's language is also very different, with the term "Indigenous Innovation" appearing only twice. Kennedy (2015) indeed believes that “from a Chinese national-interest perspective, this plan is much better conceived and more appropriate for China's situation than the Indigenous Innovation approach”.

MIC25 goal is to propel China through already mentioned middle-income trap and transform the nation into an international competitive manufacturing superpower largely independent of foreign technology.

But, and as we have been arguing, this goal is also driven by a deeper political motivation of the CPC: “it needs to ensure China’s economic well-being to legitimize its increasingly tight grip on the country” (Zenglein & Holzmann, 2019, p.19).

National Innovation-Driven Development Strategy (2016-2050).

In 2016, the Central Committee of the CPC and the State Council issued the Outline of the National Innovation-Driven Development Strategy. For the first time, it explicitly states that innovation becomes the primary force driving development. The policies outlined in this approach share similarities with those mentioned earlier. For example, it recognizes that national prosperity is linked to innovation and highlights the importance of S&T in achieving the Chinese dream of rejuvenation. It also acknowledges that China must transition from quantity growth to quality improvement, and stresses the need for independent innovation with Chinese characteristics.

Furthermore, the approach suggests that socialism with Chinese characteristics can combine the advantages of concentrated power for major undertakings with the market allocation of resources. However, it acknowledges that some critical core technologies are controlled by others and calls for a focus on technological innovation as the driving force behind comprehensive innovation. By adopting these principles, China can avoid past mistakes of letting technological revolutions pass it by, leading to technological and national weakness (State Council, 2016, translated by CSET, 2019). Benchmark of entering by 2020 in the rank of innovation-oriented countries is repeated as in MLP (and achieved as mentioned), as well as by 2030 be ranked among the leading innovation-oriented countries, and by 2050 be established as a world S&T innovation superpower (both highlighted in MLP and MIC25).

According to the Outline, becoming innovation-driven is a systemic transformation, as its layout must proceed in accordance with persisting in a two-wheel drive approach, constructing one system. The “two wheels” are scientific and technological innovation on one hand, and institutional and mechanism innovation on the other, and they are mutually coordinated and supply power continually. “One system” refers to building a national innovation system, an ecosystem in which innovation entities can collaborate and interact.

Some strategic tasks are identified to achieve this innovation-driven strategy: Promote innovation in industrial technology systems and create new development advantages; Strengthen Original Innovation and enhance sources of supply; Optimize the regional layout of innovation and create regional economic growth poles; Implement significant S&T projects and engineering works; Promote innovation and entrepreneurship and stimulate the creative vitality of the whole society, among others (State Council, 2016, translated by CSET, 2019).

With this plan being the last one that we analyze in detail, and one of the most recent in terms of the innovation strategy that the CPC seeks to implement, what we can conclude is that we are definitely in that NIS 3.0 scenario. This is because S&T is once again given the initial preponderance of the NIS 1.0 approach. In addition, the importance of the primarily technological approach is recognized in this process, which has as its ultimate goal to be both independent from other countries and disruptive (Indigenous innovation). Additionally, because even recognizing the importance of the market, it is mentioned that

the Chinese model can combine the advantages of concentrated power for major undertakings with the market allocation of resources.

However, these are not the only plans approved by the CPC linked to innovation, but the government also in 2014 published a whole set of key national economic initiatives that relied on new technologies. In this respect, Premier Li Keqiang's promotion of mass entrepreneurship and mass innovation in 2014 spurred a great wave of tech entrepreneurship activities (Chen & Li, 2022, p.23). These include, but out of the scope of this thesis: the 14th Five-Year Plan (2021-2025), the Plan for the Development of the Robotics Industry, the Three-Year Plan for the Implementation of Artificial Intelligence Internet Plus, the Plan for the Development of the Next Generation of Artificial Intelligence and, most recently, the Plan for the New Infrastructure and China Standards 2035. Its objectives are none other than China being at the forefront of industries such as semiconductor manufacturing, robotics, electric cars, the industrial internet, to be the first country in which the infrastructures are managed by technologies such as 5G, and that by 2035 the country will globally set the next standards in areas such as AI, the 5G or the Internet of things (Feijoó, 2021, p.36).

We can conclude that the impact of China's innovation policy in the catching up process is complex. In China, "billions of dollars can be moved when someone from the top leadership signals a policy focus or shift" (Chen & Li, 2022, p.23). In sectors with clear government focus and objectives, such as high-speed trains and telecommunication, it seems that it has yielded some good results. However, some authors defend that it seems to have worked only in sectors where the CPC can manipulate the market. China's early innovation policy has been based on the idea that, when left to market forces or bottom-up processes, scientific breakthroughs might not occur in areas the government deems important for national development (Liu et al., 2017, p.661).

4.1.6. Regional innovation poles

Capacity for innovation in China differs geographically. Three regions are identified as the cores of innovation in China, which are Beijing and surrounding areas, the Yangtze River Delta and the Pearl River Delta, "they together attract 30% of China's R&D investment and 43% of the nation's high-tech enterprises and produce 38% of all patents" (Hassink et al., 2020, p.28), showing a stronger innovation capacity in East China.

In this regard it is worth mentioning the great focus on high-tech enterprises, exemplified in the widespread establishment of high-tech zones and incubators, initiated at the end of 1980s. Based on Silicon Valley's success, "the government hoped these high-tech zones would eventually lead to the emergence of robust industrial clusters, which in turn could provide a well-functioning platform for innovation activities" (Liu et al., 2017, p.661). In addition, an innovation center scheme envisions national-level "core" centers and various "supplementary" centers at provincial level, meant to leverage corporate alliances and focus on the entire innovation chain of industry-specific, cutting-edge technologies and related services. In this regard, 12 national centers geographically distributed (see [Figure E](#)) have been launched, prominent in Beijing, Xi'an and Guangdong (Zenglein & Holzmann, 2019, p.37).

The capacity for innovation in China varies geographically, and the CPC's approach to innovation has evolved to become regionally focused. While initially national in scope, it has now become a pattern of innovation development unique to each region.

The eastern region it's supposed to concentrate on raising its Original Innovation (原始创新) and Integrated Innovation (集成创新) capability, accelerate innovation-driven development transformation across the board, and cultivate industry clusters and regional economies possessing international competitiveness. In contrast, the central region is following a differentiated leapfrog-style development path, flexibly aggregating innovation resources, becoming innovation-led in key fields, and cultivating emerging industries and strong economies with regional characteristics by accelerating the extension and application of advanced appropriate technology (State Council, 2016).

In conclusion, the capacity for innovation in China is complex and multifaceted, varying geographically and evolving over time. The country's focus on high-tech enterprises, establishment of high-tech zones and incubators, and launch of national innovation centers all reflect a concerted effort to promote innovation and drive economic growth. However, the efficiency and cost-effectiveness of government efforts to bolster strategic industries through technology transfer and research funding in SOEs, CAS institutes, or key universities remains a topic of debate. The CPC's approach to innovation has also evolved from a national focus to a regionally focused development pattern, with each region having its own unique features and priorities. Overall, the capacity for innovation in China is a critical factor in the country's economic development and global

competitiveness, and ongoing efforts to promote and support innovation will likely continue to be a key priority for the Chinese government in the years to come.

4.2. Analysis. Strategic Public Intervention

“eBay may be a shark in the ocean, but I am a crocodile in the Yangtze River. If we fight in the ocean, we lose—but if we fight in the river, we win”

(Jack Ma, founder of Alibaba, 2003).

Once we have identified the role that innovation plays in China, both from a point of view of Realism and guaranteeing survival, as well as from the importance given to it in IR, as well as the consequent construction of the legitimacy of the CPC through the innovation, it is necessary to continue with the analysis. This is because we have provided a prior context in which we have not only explained the basic organic structure of the CPC and its institutions, but also because we have identified how Xi's dream of building China into a great modern socialist country materializes. Additionally, we have identified how, as a result of the 20th Party Congress, the leadership of power –PBSC– is made up only of Xi's supporters, reinforcing his power, and those leaders of the Populist Coalition are replaced as well as those more market-reform oriented. And to finally understand how this National Innovation System has evolved and the policies in which it has materialized.

It is from this previous framework, from which we can analyze not so much the direct influence of CPC on innovation, but rather the growth of bottom-up innovation thanks to a large extent to the technology sector. And within this narrative of leadership thanks to certain private technology companies, how the CPC has responded, not with its public policies, but with its interaction and the balance to be maintained with them.

4.2.1. Key private players in the technology sector

While it is difficult to identify concrete proof of the effectiveness of the government's initial innovation policy, there exist several instances of remarkably innovative Chinese enterprises that have thrived despite, or even because of, they did not benefit from favorable government initiatives or interventions. This is particularly true for the dynamic and vibrant group of Chinese internet service providers (Liu et al., 2017, p.663). In addition, private firms grow in importance since they contribute to three-fifths of GDP and four-fifths of urban employment (The Economist, 2020).

We mentioned in the theoretical framework that regarding the contributions to global development made by China in relation to the innovation ecosystem, the electronic

commerce, mobile payments, shared bicycles and high-speed trains were industries to be highlighted. It is true that digital technologies are changing China's economy, according to experts like Zhang Jung, dean of the Faculty of Economics at Fudan University, but they are doing so more as a result of the growth of businesses made possible by the Internet and mobile devices than as a result of the development of new disruptive technologies. Moreover, and as Feijoo (2021) adds, it is not obvious that these changes have had to do with the industrial policies of the government –those mentioned in the previous section– but rather that it has been due mostly to the entrepreneurial nature of private companies. For example, “the development of industries such as AI, alternative energy vehicles, facial recognition, big data or digital payment and communication systems was mainly driven by the entrepreneurial spirit of private companies vying for business opportunities” (Zenglein & Holzmann, 2019, p.43).

Feijoo (2021) concludes that this is perhaps the most interesting lesson from the development of these innovation systems in China: that the government allows companies to experiment with new technologies and business models, and only when they have some success is it checked whether this new solution is aligned with the objectives that the CPC considers for society as a whole (p.139). In this line, Zenglein and Holzmann (2019) also defend that, as soon as a company becomes a leader in a sector of national strategic importance, it is expected to contribute to reaching national goals and to team up with the government. A prominent example was the recruitment of a national AI team by the Ministry of Industry and Information Technology in 2017 including internet giants Baidu and Alibaba and the AI companies iFlyTek and SenseTime” (Zenglein & Holzmann, 2019, p.43).

But who are these key private companies in the technology sector? It is defended that “for a collectivist state, China is remarkably reliant on private enterprise. As it ages, and its economy shifts from manufacturing for export to domestic services, the entrepreneurial class grows in stature” (The Economist, 2020). In addition, the PRC recognized its first private business in 1980, when 19 year old street hawker Zhang Huamei registered her stall selling buttons and toys in Wenzhou.

Since then the party has developed its own form of “economic gardening”: the notion that grassroots entrepreneurs drive growth. “It told business folk what not to do—certain industries, such as tobacco, were out of bounds—but otherwise let them grow unimpeded” (The Economist, 2020).

If in the United States the acronym GAFAM summarizes the relevant companies regarding new technologies (Google, Apple, Facebook, Amazon and Microsoft), in China its equivalent would be BAT: Baidu, Alibaba and Tencent, although the list of relevant companies is quite longer. Baidu, as we have pointed out, is already the equivalent of Chinese Google, and Alibaba and Tencent are the parent company of a large conglomerate of enterprises that offer the most varied products and services, so it is more adequate to add the noun "Group". The objective of this thesis is not to explain in detail the conglomerate of these companies, but to present a general overview, that explains why we only provide an introduction to Alibaba's Group and some other large companies.

In this respect, in 2014, Alibaba Group became the shark of the Yangtze River when it went public on the New York Stock Exchange through the largest IPO of the year, valuing the company at more than three times the market cap of eBay (Li and Chen, 2021, p.17). Alibaba Group can be divided into the following major sectors: Commerce, both in China and internationally; local consumer services; logistic infrastructure; e-commerce infrastructure; digital media and entertainment; innovation initiatives; and cloud services (refer to [Figure G](#) for a complete list of companies included in each sector).

Furthermore, as exemplified in Alibaba's Quarterly Report Q3 of 2020, the major revenue contribution by segments is composed of 66% by commerce (both retail marketplaces and other retail), followed by 8% in cloud services as its second major revenue segment (refer to [Figure H](#) for a complete record of revenue contribution by segments for each company). Worth mentioning among the ecommerce infrastructure is Ant Group, that started from Alipay—a payment and settlement tool used to facilitate transactions on Alibaba's ecommerce platforms. Over the years, it has grown into a digital finance behemoth in China (Li and Chen, 2021).

A second group of large companies worth mentioning in the field of new technologies includes: Didi Chuxing, specializing in car sharing similar to Uber or Cabify; Meituan, which offers on-demand and at-home services and was the third most valuable company in China in 2019, surpassing Baidu; Huawei, known for providing mobile phones and network infrastructure for 5G; JDI, the leading drone company, which, like Huawei, is under scrutiny from various countries over its relationship with the Chinese government

and its ability to access confidential data; iFlytek, specializing in voice recognition and formerly a unicorn; Xiaomi, which, in addition to its mobile devices, is attempting to create a hardware ecosystem and is the company that has accessed the *Fortune500* list the fastest; and ByteDance, known worldwide for its short video social application TikTok, but which has other solutions related to the automatic aggregation of content and social networks (Feijoo, 2021, p.58).

A great example of the strength of the private sector in key emerging industries, is that CEOs of relevant companies such as Alibaba, Baidu, Huawei and Tencent are able to exercise some level of influence on the direction of CCP policymaking in their respective fields. For example, the Internet Plus strategy and a stronger emphasis on AI was largely driven by private tech companies. However, this does not amount to a fundamental change in the balance of power between the state and the private sector. From the CPC's perspective, as we already mentioned, "China's private tech companies have to align their business with overarching national goals related to national competitiveness, but also to securing supply chains and developing emerging dual-use technologies for surveillance and military purposes" (Zenglein & Holzmann, 2019, p.43).

4.2.2. Involvement of the CPC in the technology sector

In another era, before Xi's rising power, when tech companies were living a golden age in China, and Beijing had not yet clamped down on large digital corporations, Li Qiang, then governor of Zhejiang, the province where Alibaba is based, attended internet summits and encouraged citizens to emulate Jack Ma. In one of his first interviews in that position in 2013, the current Premier praised deregulation as a formula for the development of private companies and entire industries in the Chinese business magazine *Caixin*. And he said: The greatest success of China's reform and opening-up campaign has been to encourage people to innovate and take the initiative (April, 2023).

This is no longer the approach, and one of the main challenges identified in China's vibrant ecosystem of private enterprise is precisely the increasingly heavy hand on it: "the party looks more hostile to it than at any time since before Deng set up special economic zones in the 1980s. Xi favors state-led development over private-sector effervescence, maybe seeing the cult of entrepreneurs as a rival source of authority" (The Economist, 2020).

Leadership watchers say Li Qiang's closeness to Xi is both a strength and a vulnerability, because while he has Xi's trust, he is beholden to his long-time patron. In this sense, in his position as former Party Secretary of the CPC in Shanghai, he unceremoniously complied with the CPC orders when imposing the harsh confinement that devastated the city. Currently Li is a national leader, “working under a market-sceptic boss, and he has to balance growth with a range of social, technological, and geopolitical goals” (Lun Tian, Chen & Cash, 2023). Currently, control over the private sector is increasing and to a large extent new investments will be directed towards State-Owned Enterprises. A perfect example of this trend is the growing state surveillance of Jack Ma, who has practically disappeared of the public sphere since he criticized the Chinese regulatory system in 2020 and Beijing decided to stop the IPO of Ant Group, the aforementioned Alibaba Group digital finance company (April, 2023).

In our theoretical framework, we adopted realism as an approach to analyzing China's complex reality, and specifically that of its CPC. This thesis argues that China presents as its *capabilities* the Party-state innovation policies that we have studied in the previous section, but that its progressive *intentions*, especially with Xi as General Secretary, are geared towards the state's dominance of innovation, especially in the technology sector.

According to Mearsheimer's (2001) second bedrock assumption, great powers possess inherent offensive military capabilities, which can be reasonably measured as they are largely composed of tangible objects that can be seen, assessed, and counted. In the context of this thesis, we refer to technological power and innovation capacity as capabilities, which can be seen and identified through Party-state policies. However, intentions are different. Mearsheimer's (2001) third bedrock assumption states that a state can never be certain about another state's intentions, as they are difficult to measure since they exist inside the heads of leaders.

Because of the complexity to measure intentions, we can only hypothesize the CPC's possible intentions through a progressive state intervention in the technology sector, examining the role of State-Owned Enterprises, the use of Golden shares, and access to finance, among some of the criteria that may point towards the CPC's aim of dominating innovation in China.

a. State-Owned Enterprises

At a conference discussing the 20th Party Congress titled *Where is China*, Agueda Parra (2022) made the assertion that State-Owned Enterprises were poised to supplant private companies in their role as economic leaders. According to Parra, the CPC's intention was to transition to an economy led by SOEs. While the end goal had not changed, the means of achieving it had. If private companies were to take over the mantle of public companies, the nature of the economy would remain the same, but the approach would differ. It is imperative, therefore, to consider whether the ascendancy of SOEs represents a threat to private companies' progressiveness and viability in this regard.

In China, SOEs are at the core of the coexistence between the state and the market (WB & DRC, 2019, p.20). Not only are SOEs at the centre of this coexistence, but the very name of the Chinese enterprise, 公司, regardless of its public, private or mixed nature, includes in its nomenclature the character 公, meaning "public". Many industries which the Chinese government labels as either "key industries" (including ship building, aviation, high-speed railways) or "pillar industries" (including electronics, equipment manufacturing and automotive) remain dominated by SOEs (Zenglein & Holzmann, 2019, p.45). This point is particularly important, as it seems that in the sectors that the government considers to be key, it is able to dominate industrial leadership with SOEs. Thus, for example, in the aviation and space equipment sector, all three leading companies are SOEs, and the same is true for the maritime equipment and high tech ships sectors, as well as advance railway transportation (See [Figure I](#)).

Parra's (2022) assertion raises an intriguing question about the role of the CPC in sectors that are a priority but not necessarily led industrially. Take for example the Next-generation IT sector, where private companies like Huawei, Alibaba, Tencent, and iFlytek dominate (see [Figure I](#)).

Not only are private companies taking the lead, but their creators have become cultural icons. Jack Ma, for instance, who twice failed to get into university, started Alibaba in a cramped Hangzhou apartment, captivating millions with his tale. Biographies of rock star founders such as Jack and Pony Ma of Tencent, an online games-to-payments giant, are flying off the shelves, and their wealth commands admiration rather than envy (The Economist, 2020). In this realm, we observe a heavy hand in the private sector where the CPC appears more hostile than at any time since before Deng established special economic zones, with Xi viewing the cult of entrepreneurs as a rival source of authority.

The CPC's intensified regulation of China's private sector, known as the tech crackdown, began in late 2020 and impacted leading internet-based conglomerates, forcing them to refocus on local compliance after years of unchecked growth and monopolistic behavior. The crackdown included decisive actions, such as the SAMR imposing substantial fines on corporate giants Alibaba and Meituan, totaling US\$2.8 billion and US\$530 million. The rapid succession of technology regulations and penalties caused instability in the Chinese market, leading to Alibaba's shares dropping by over two-thirds compared to 2020. This crackdown is seen as a response to the need to control unchecked growth, but it also reveals the CPC's tightening grip on the country's tech sector (Interesse, 2023).

The idea of a large private business outshining the party is highly disliked by the Communist authorities, according to *The Economist* (2023). These concerns led to a two-year crackdown on digital titans like Alibaba, which cost the company nearly \$700 billion at its worst and led to the forced disaggregation of its empire. While a split was rumored to be imminent, Alibaba has now announced the creation of six independent business units, which executives believe will lead to a more agile overall business (*The Economist*, 2023). Meanwhile, Xi Jinping (2022) announced at the 20th Party Congress that the reform of SOEs will be deepened, the layout of the state-owned sector will be improved, and the core competitiveness of SOEs will be enhanced to make them stronger, better, and bigger.

Moreover, an essential aspect of China's efforts to catch up in innovation involved providing significant assistance to SOEs. This aid took the form of direct government funding, with SOEs receiving more government support for research and development than private or foreign firms.

Additionally, SOEs received preferential treatment concerning taxes, land use, and other areas. For example, BOE Technology Group, an SOE that manufactures semiconductor displays, received one-third of its R&D funding directly from the government. The government's favoritism towards SOEs is particularly evident in the high-technology industry, where "government support for S&T activities to SOEs in the high technology industry more than doubled" within a five-year period (Liu et al., 2017).

For instance, in one hand we have the party-state process in which we see a huge movement of "nationalization" of the innovation, after the bottom up entrepreneurs created growth, being key for the CPC to control it. Nonetheless, we also see the need to

let the market grow and stop the interventionism to achieve long term efficiency and productivity. A risky balance in terms of politics for the Party State.

The risks posed by SOE innovation strategy are twofold. Firstly, impact on decision making. Xi Jinping keeps on centralizing political power around him and taking direct control over economic and technology policy making. If the State still prevails a vast predominance of the economy through SOEs, a technocratic establishment is needed to implement these policies. However, the centralized strategy of Xi might be weakening the technocratic establishment, and this combined with the strong hand policy, China could be running into management problems. Nonetheless, a counter argument to this risk could be that precisely that the new CPC Politburo Standing Committee is dominated not only by Xi loyalists, but also technocrats, countering the risk of absence of a technocratic establishment. Secondly, when the government is heavily involved in steering outcomes and investing in particular classes of firms, it becomes entangled with the interests of these firms, potentially limiting innovation to the established norms and interests of these firms (Law, 2022).

As technology progresses and innovation becomes increasingly important in the global economy, China is seeking to maintain its competitive edge. One key element of this strategy is the role of State-Owned Enterprises (SOEs). While private companies dominate certain sectors such as the Next-generation IT sector, the Chinese government continues to heavily favor SOEs in industries deemed essential to national security, such as aviation, high-speed railways, and maritime equipment. This has raised concerns about the role of SOEs in China's economy and the potential threat they pose to private companies.

The CPC's recent intensified regulation of China's private sector, known as the tech crackdown, has further underscored the tension between the government and private enterprises. The crackdown led to instability in the Chinese market and significant fines imposed on leading internet-based conglomerates such as Alibaba and Meituan. However, the Chinese government's support for SOEs has also played a significant role in China's progress in innovation.

In conclusion, China's emphasis on SOEs is a significant factor in its push for innovation and maintaining its competitive edge. However, this approach also creates tensions between the government and private companies, leading to concerns about the impact on

decision making, the weakening of the technocratic establishment, and potential management problems. Achieving a balance between state interventionism and market growth will be key to China's long-term success.

b. Golden shares

The Chinese government's funding of strategic investments in infrastructure and capabilities, coupled with a devolution of strategic control over resource allocation to business firm executives, has been vital in explaining China's dynamic growth over the past few decades. Such control has been devolved across a range of ownership structures, including state-owned enterprises (SOEs), publicly listed companies with dual-class or golden shares (such as Alibaba), and even 100% employee-owned companies like Huawei Technologies (Li & Lazonick, 2022, p. 4). In addition to the role played by SOEs in the innovation process, as well as their relationship with the technology sector and the unique leadership strategy that prevails in the CPC, we can identify other indirect forms of control of the private sector by the Party: golden shares

Golden shares are special types of shares issued by a company that give their holder certain veto powers or decision-making rights, typically in areas that are critical to the company's operations. Normal shares provide their owners with voting rights and a proportional share of the company's profits. The number of votes a shareholder can cast is proportional to the number of shares they own. This means that the more shares a shareholder has, the more voting power they have in the decision-making process of the company. In contrast, golden shares give their holders additional voting rights and control over certain decisions made by the company.

For example, a golden share may allow its holder to veto certain decisions, such as changes to the company's articles of association, mergers and acquisitions, or other strategic decisions. In the CPC context, golden shares allow government officials to be directly involved in their businesses, including having a say in the content they provide to hundreds of millions of people (He, 2023)

To increase state control over large technology companies, the Chinese government has adopted a new approach: apart from relying on SOEs, it has turned to golden shares. Known in China as "special management shares," these give the government significant voting rights or even veto power over specific business decisions and content, especially in the case of internet firms. The government introduced these shares in 2013 to

strengthen its control over state-backed media firms, which later became available to private investors. However, as mobile internet use grew, the government also acquired such shares in several private tech companies operating news and video apps to maintain its hold over online information (He, 2023).

According to Qichacha, a business data platform, in April 2021, a government entity acquired a 1% stake in a Beijing-based subsidiary of Bytedance, the parent company of TikTok. The subsidiary holds important operating licenses for Douyin, China's most popular short-video app with over 600 million active users, and Toutiao, a news aggregation app. In addition, Qichacha reports that in March 2023, a fund controlled by the Cyberspace Administration of China obtained a 1% stake in Guangzhou Lujiao Information Technology, a digital media subsidiary of Alibaba (He, 2023).

To sum up, the coexistence of numerous ownership arrangements enables various forms of strategic control in industries that serve to various economic needs. Critical infrastructure sectors including highways, railroads energy, communications, and steel have all remained SOE in China, with the government ensuring that there would be more than enough capacity to fulfill the demands of other economic sectors' fast expansion. However, the Chinese government has not mandated that businesses be SOEs in those industries where there is rapid technological change and the need to respond quickly to new market opportunities. Instead, it has been willing to give business organizations with "hundred flowers" governance structures the ability to delegate strategic control (Li & Lazonick, 2022, p.5).

4.3. Discussion. A new source of legitimation?

4.3.1. Legitimation

Feijoo (2021) states that any conversation with a person educated in China's higher education system easily confirms that social stability, meritocracy and economic development are the supreme values and, for the time being, largely justify the political decisions made by the party (p.46). So far we have analyzed the direct role of the CPC in innovation, as well as its interaction with the private sector in the technological field. This has allowed us to identify a number of patterns: that it is precisely the Party that is placing increasing importance on innovation, both in public discourse on innovation and in successive Party-state policies; that under Xi's power we find not only a concentration of

its supporters in the PBSC, but also a technocratic leadership; and that although private technology companies have managed to become leaders in certain sectors (such as Alibaba, Tencent, Huawei or Xiaomi), this has been viewed with some suspicion by the CPC, especially with Xi Jinping in power (thus preventing IPOs or buying gold shares).

In this section, and thanks to the theoretical framework provided, we have to ask questions about the causes. What are the possible causes of these patterns? How can we understand the role of innovation in China and its Party-state system? Could we link innovation to a legitimization strategy of the CPC?

We mentioned in the theoretical framework both the theories proposed by Max Weber and by Sandby-Thomas to explain the sources of regime legitimacy. We concluded that Weber's theory three basic sources of legitimacy –traditional, charismatic and rational legal– did not allow to explain the current situation in China. Even more, Weber's legitimacy typology was motivated by the deeper question of why some regimes, even in the face of unfavorable performance, continue to enjoy popular validation. This thesis does not explore the question of how the CPC would maintain its legitimacy in the event of poor performance. Instead, we focus on how the CPC is actively working to prevent such a situation from occurring, first with the emphasis being placed on economic growth and, as we argue here, currently and progressively on innovation. Thus, we understand favorable economic performance as a framework for the survival of the CPC, in which it is not necessary to delve into the question of its legitimacy, but rather legitimization.

From this perspective, we preferred Sandby-Thomas (2014) framework, that relied to explain China's current situation on legitimization, rather than legitimacy. In this, legitimization, rather than legitimacy, offers the prospect of better explaining why the CPC has managed to remain in power. From legitimization, governance reforms are no longer measured in terms of the overall legitimacy of the CPC but are analyzed as part of the various attempts to legitimize the regime. We wrote that, in this sense, the problem that arises was to identify not the sources of legitimacy, but of legitimization. If legitimization was an activity, we could only identify it in a specific context, and from specific attempts, which in our case is the context of Xi Jinping's China and its attempt at an innovation-driven strategy.

We had also pointed out how the greatest threats to the survival of the political regime in China are not external, but internal. And this because, and in particularly during the Century of Humiliation, Chinese power bitter lesson was that the main threat to the country's sovereignty and autonomy is not to be found outside but lies in its own internal stability (Gil, 2020, p.17-19). In this realm, “according to Xi, the most dangerous threats to national security are internal, non-traditional, political and emerging, rather than external, traditional, geostrategic and imminent” (Ming Cheung, 2022, p.166).

4.3.2. Innovation: a new source of legitimation

Based on the various factors and attempts at innovation in the specific context, it can be concluded that the sources of legitimation are primarily centered around economic performance, nationalism, and most importantly, security and stability.

Regarding China's economic performance, it was previously mentioned that the country has transformed from a technological backwater to an innovation powerhouse. This is due to the fact that simply copying was not enough to explain China's current situation where it can no longer be considered the copycat of the world. Furthermore, China ranks 1st in innovation economy by income group, 3rd by region, and 11th worldwide (out of 132 countries) in the 2022 Global Innovation Index.

It was also previously explained how technology acquired and developed in China has become a blueprint for leadership, as China's political and social model aims to return the Empire at the Centre (中國) to the place it has held for most of mankind's history as the most socially and technologically advanced nation.

Moreover, it was mentioned that China's "innovation imperative" framework proposes that the catch-up process of middle-income economies goes through having a system capable of being innovative, particularly in the technological field, to avoid the middle-income trap. China is a perfect reflection of this idea, focusing on high-quality growth and efficiency through an Original, Integrated, and Re-Innovation strategy. All of this is viewed through the prism of building China into a great modern socialist country.

Additionally, economic performance is closely link to Xi Jinping's view of history. In the tradition of Confucius, in his books and speeches, he argues that a leader must understand the historical trajectory and take advantage of it, not go against it. And that one of the critical components of the current evolution of the world is the need for economic development, far above elusive Western concepts that have not proven their ability to achieve this development. Indeed, in Xi's thinking it is the lack of economic development that generates the possibility of conflict (Feijoo, 2021, p.119).

Regarding Nationalism, Xi Jinping's Thought on Socialism with Chinese Characteristics for a New Era was enshrined in China's constitution, hence cementing its legacy. In addition, at the 20th in 2022 Party Congress he broke the two-term limit for top leaders established by Deng Xiaoping. Even above this concentration of power, it has broken the balance between Populist and Elitist Coalition in the PBSC configuration for the first time, also as we have mentioned. To summarize, the recent PBSC lineup suggests that Xi has eliminated any remaining factional opposition in the party, rendering discussions about traditional factional groups irrelevant. In this way, the current General Secretary has surrounded himself only with its supporters and presented ambitions unlike any Party leader since Mao Zedong.

In the context of innovation, this concentration of power is not only important because of Xi's ability to implement public policies or potential market insecurities caused by such power, but also because of the technocratic composition of the PBSC, which indicates the direction the CPC wants to take. This explains the impact of the public policies described above, respectively: The National Guideline for Medium- and Long-term Plans for Science and Technology Development (2006-2020); Made in China 2025 (2015-2025); and the National Innovation-Driven Development Strategy (2016-2050).

Regarding security, because it is precisely this that, from a realistic IR theory approach, allows guaranteeing the survival of a State. On the issue of core national interests, the balance between development, security and sovereignty has also been revised under Xi's tenure. From Deng Xiaoping to Hu Jintao, development was by far the most important national priority, but Xi has elevated security to the same level, if not higher. According to Xi, national security and development are deeply intertwined: "security and

development are two sides of the same issue, two wheels in the same driving mechanism. Security guarantees development, and development is the goal of security (Ming Cheung, 2022, p.166).

Lastly, stability, which can only be achieved if economic development, nationalism, and security are guaranteed. The identification of stability as a source of regime legitimation suggests that the CPC “no longer derived its legitimacy from its ‘technical capacity’ to deliver economic growth but from its ‘political capacity’ to create a stable environment in which economic development can take place” (Sandby-Thomas, 2014, p. 587). It is precisely this technical capacity that the CPC manifests in relation to innovation. Both because of its public policies, and because of the power concentrated by Xi that allows it to carry them out, and because of its strong intervention in the private sector, a set of issues that have a direct impact on the stability of the regime.

Sandby-Thomas (2014) analyzed the CPC’s use of the stability discourse to legitimize its authority by focusing on the People's Daily as the 'organ' of the CPC Central Committee and its direct link to the Party's Propaganda Department. The resulting analysis revealed that stability was presented in a nominalized form that served to 'mystify' its definition, making it discursively flexible.

Stability was constructed as a positive value that indirectly legitimized the authority of the CPC and a negative value that delegitimized the other. The link between maintaining stability and preserving the CPC’s power was obscured in favor of presenting stability as an issue of national interest.

We can conclude that Xi Jinping's ideology, as reflected in the public discourse on innovation and in successive Party-state policies, possesses a strong systemic component that goes beyond typical economic policies found in other countries. The concepts of self-reliance, system architecture, emerging technologies, core industries, and the importance of science and technology are constantly mentioned. Although the private sector is allowed to experiment, it is always under the control of the Party-state, and evidence-based decision-making is highly valued to facilitate timely adjustments. This approach resembles the planning of a large-scale innovation industry that allows Xi Jinping to subtly associate his leadership with the Mandate of Heaven, while also ensuring the CPC's economic performance, nationalism, security, and overall stability.

Interestingly, this strong systemic component presents a paradox, as even major private technology companies adopt a similar structure to that of the Party-state system, in the form of SuperApps. As a perfect example of what a SuperApp is, see [Figure J](#) and [Figure K](#) for an overview of the variety of services offered within WeChat or Alipay. This paradox warrants further investigation in the future.

V. CONCLUSIONS

*Be not weary, sirs, of listening to these digressions;
my sorrow is not one of those that can or should be told tersely and briefly,
for to me each incident seems to call for many words*

- Don Quijote de la Mancha, First Part, Chapter XXVII.

The conclusion follows a structured approach by answering the hypothesis, discussing the main findings and results, highlighting possible limitations, and outlining policy avenues. It provides a comprehensive summary of the thesis and its key arguments.

Hypothesis

The main hypothesis of this thesis is that commitment to innovation of the Party-state is a guarantee for the survival of the Chinese Party-state political system. Based on the context, analysis, and discussion, it is concluded that innovation does indeed respond to a legitimation, not legitimacy, role of the Communist Party of China. The main contribution of this thesis has been precisely to link innovation to the question of the legitimation of the Party-state political system. Overall, the thesis offered a comprehensive analysis of the CPC's role in China's innovation process, including the party state policies, public strategic intervention in the technology sector, and the impact on the Communist Party's legitimacy.

Main results and findings

First. China is no longer the copycat of the world. China in the last 40 years transformed from a manufacturing economy to one of progressive cutting-edge innovation. In addition, it has confronted and proved incorrect academic predictions about its inability to innovate and successfully achieve technological breakthroughs.

Second. When analyzing China's role in International Relations, the theory that best fits the country is Realism, and it can be applied to understand the race for power, materialized in the race for innovation, that has characterized China in the last decades.

Third. The significance of innovation from an International Relations perspective lies on the innovative imperative framework, that implies that emerging economies face a greater

challenge than previously thought by IR scholars. It is not enough to rely on the diminishing returns of developed nations to catch up, they must also become more efficient through innovation. This is particularly important in the case of China, subject to the middle income trap.

Fourth. To approach the complex CPC reality, a legitimation framework is a better suiter than that of legitimacy. While legitimacy is a static property external to a political system, difficult to operationalize, legitimation is a dynamic process essential for a political system, an activity.

Fifth. There are three types of innovations in China: Original Innovation; Integrated Innovation, and Re-Innovation. The combination of these three types of innovation is what is known as Indigenous Innovation.

Sixth. The CPC's role in innovation has been progressive and it has attached increasing importance to innovation and has made it a state priority, with the ultimate goal of building China into a modern socialist country. Innovation has evolved through national-level top-down strategy driven by the ruling party, grassroots bottom-up entrepreneurial dynamism, a hyper-adaptive and hyper-adoptive population, and deliberate foreign direct investment strategies, creating an authentic ecosystem. The concept of innovation has essentially been translated into a technological one. Moreover, this technological approach is interrelated with one of self-reliance. Additionally, we defended the current state of innovation in China can be called NIS 3.0, that is pretty similar to a NIS 1.0 that wasn't able to actually evolve to the 2.0 scenario.

Seventh. In particular, the development of innovation has been at the forefront of public discourse, thanks to the plans described above: The National Guideline for Medium- and Long-term Plans for Science and Technology Development (2006-2020); Made in China 2025 (2015-2025); and the National Innovation-Driven Development Strategy (2016-2050), as well as all those tangentially mentioned.

This is especially relevant in the new context following the 20th Party Congress, thanks to which Xi Jinping has broken the two-term limitation, and has surrounded himself exclusively with his supporters, breaking the historical balance in the PBSC between Populist and Elitist Coalition, and surrounding himself exclusively with technocrats.

Eighth. There is strategic intervention by the CPC in the private sector. Thus, there is a complex balance between SOEs and private companies, which is always articulated in terms of core industries, industrial leadership and personality cult. In this way, different strategies are used by the CPC, from restrictive regulatory environments to impediments to IPOs, to competitive difficulties with respect to SOEs or mixed-ownership structures, that allow the CPC to strategically control these technological companies.

Ninth. There is a strategy of legitimation of the CPC through innovation. This strategy is based on the sources of: economic performance, nationalism, and most importantly, security and stability.

Limitations

The present thesis is subject to certain limitations that should be noted. Firstly, the framework used is focused on legitimation rather than legitimacy, which may require additional research on the historical development of legitimation in China and its challenges. Furthermore, measuring such a concept within a political regime like the Chinese party-state presents complexity, which qualitative and quantitative analysis may be relevant for. Moreover, the International Relations framework used for analysis is that of Realism, which is a Western-centric approach that may not fully consider the particularities and currents of Asian International Relations theory, especially in the case of China (e.g. the Tsinghua School approach). It would be interesting to see whether the analysis carried out would change if an Asian International Relations theory was applied.

Additionally, it would also be relevant to study the need for innovation and technology externally, in an international context of stiff competition. Thus, exploring alternative frameworks and examining the need for innovation and technology in an international context of intense competition could further enhance the analysis.

Lastly, the analysis did not consider a comparison between market and planned economies and their respective advantages and disadvantages, which could be a topic for future research. Additionally, it may be worth investigating the growth models for each economy to better understand their potential implications.

Policy avenues for the future

We pointed out that literature has not widely covered how the role of the Party-state regarding innovation, which is more described than generally explained, can respond to an intention that does not begin with competing in the international arena (as many authors propose), but with guaranteeing its own survival within its borders. The Chinese techno-security state along with the rest of the country is scrambling to turn from being a dependent follower into an advanced and self-reliant science, technology and innovation power. A further analysis regarding this framework is needed since the CPC is going to continue betting on innovation because it is building the legitimation of its system around it. Also because the legitimacy of the CCP lies not only in economic growth (an issue that has also been widely discussed), but in being the sole architect (or at least the visible one) of this growth, which is currently taking shape in the technological sectors of the private sector.

We mentioned in this thesis that perhaps the most interesting lesson from the development of innovation systems in China was that the government allows companies to experiment with new technologies and business models, and only when they have a certain success is it checked whether the new solution is aligned with the objectives that the CPC considers for society as a whole. After the analysis carried out, we would add to this supervision mechanism, a control mechanism is added once certain industries are positioned as key in their respective sectors.

Furthermore, the extent and longevity of top-level leadership support is a crucial indicator of the strength and effectiveness of China's innovation development strategy. This strategy, known as the Innovation-Driven Development Strategy, is closely intertwined with Xi Jinping, who originated the concept and played a significant role in its development, approval, and rollout. Given the centralized nature of power in China and Xi's prominent position, this close association with the strategy is likely to benefit it in two important ways.

Firstly, Xi's strong commitment to the innovation-driven approach sends a clear signal to the bureaucracy that the strategy and associated policies must be vigorously implemented, or else face consequences. Secondly, the removal of term limits for Xi's tenure means that the innovation-driven approach can anticipate a prolonged lifespan, which is critical given its long-term focus.

To sum up, it is of crucial importance to believe that the growth of technical and scientific knowledge is ultimately a global collective good. Knowledge is not contained sharply inside any national boundary; it spills over, and it leads to further innovation and discovery.

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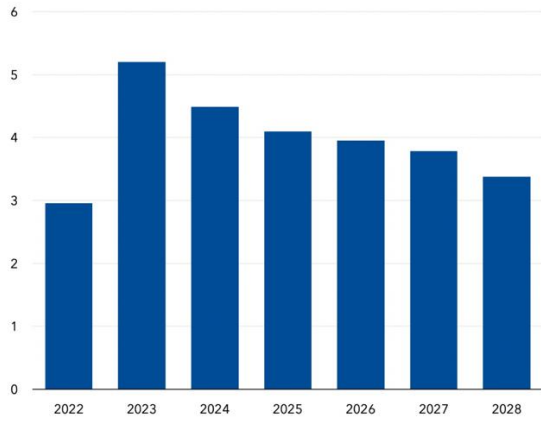
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ANNEX: INFOGRAPHICS

FIGURE A

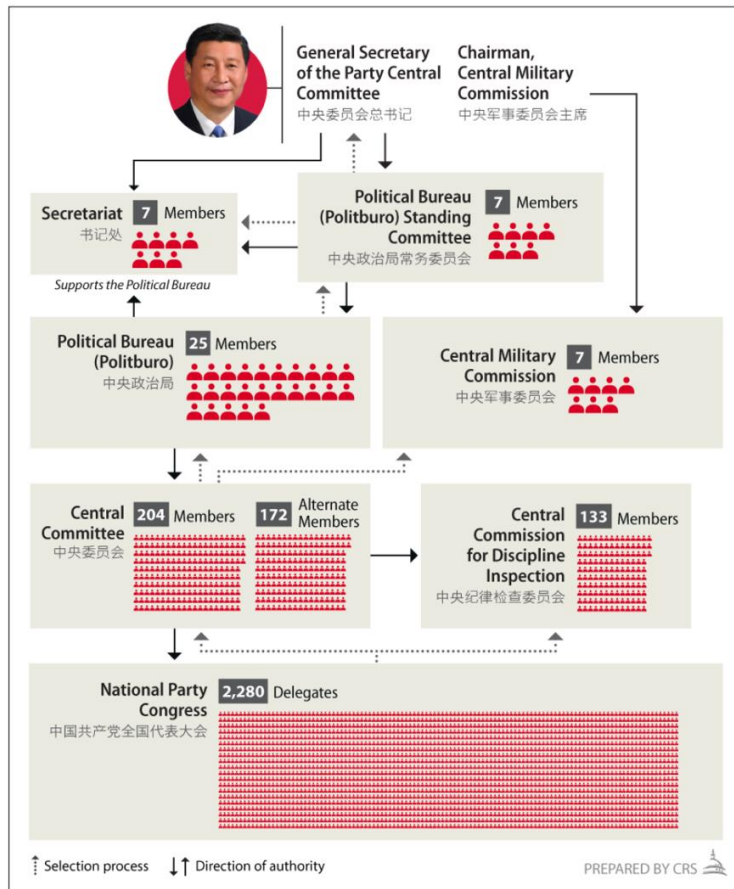
Real GDP growth in percent, year-on-year, China



Source. IMF Calculations (2023).

FIGURE B

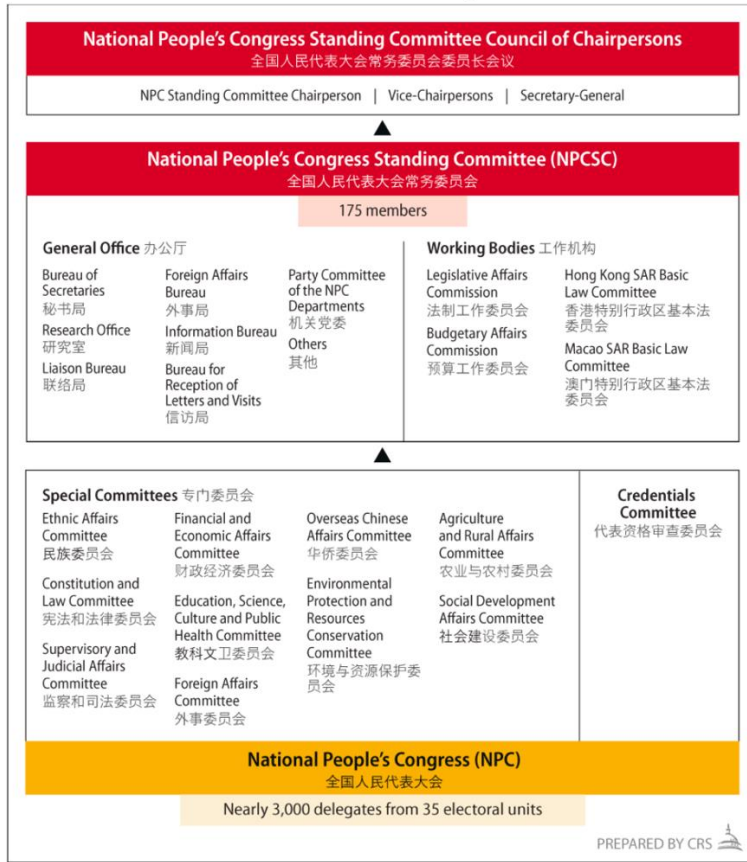
Communist Party of China hierarchy. Numbers for the 19th Central Committee, elected for a five-year term in October 2017



Source. Congressional Research Service (2021).

FIGURE C

The National People's Congress



Source. Congressional Research Service (2021).

FIGURE D

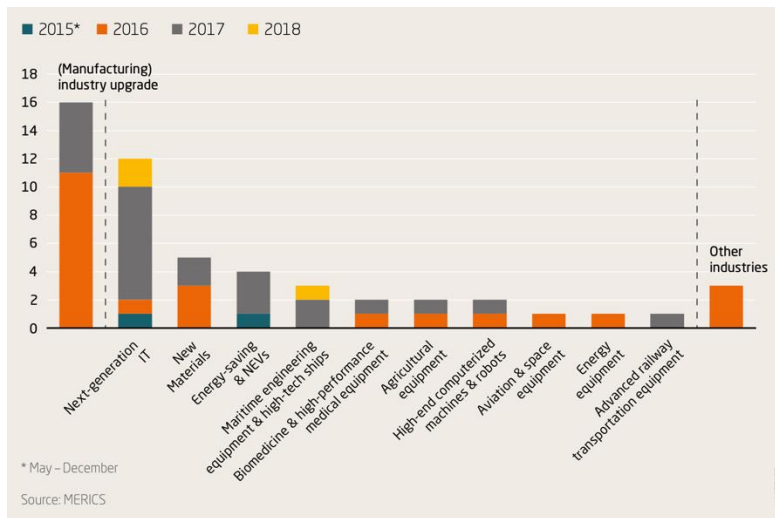
Screenshot of the interface of the Study (Xi) Strong Country application



Source. The Guardian (2019).

FIGURE E

Made in China 2025 priority industries, number of national action and development plans



Source. MERICS papers on China (2019).

FIGURE F

Made in China 2025 nationwide manufacturing innovation centers network



Source. MERICS papers on China (2019).

FIGURE G

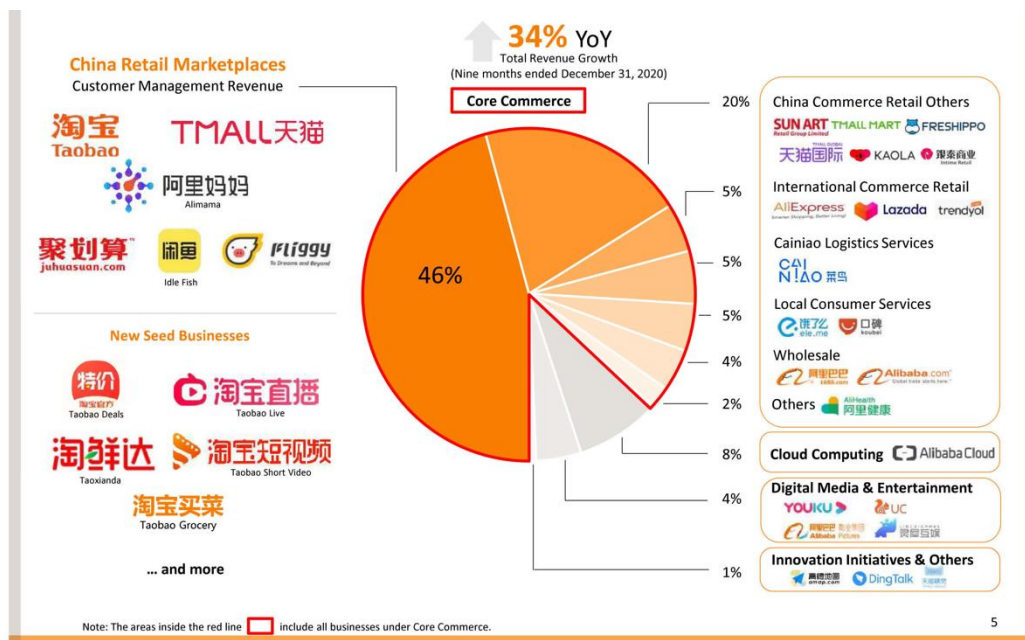
Alibaba Group enterprise composition by segments



Source: Chen and Li (2022).

FIGURE H

Alibaba Group revenue composition by segments (nine months ended 31/12/200)



Source: Alibaba Quarterly Report Q3 (2020).

FIGURE I

State-Owned and private enterprises leaders divided by MIC25 core industries

State-owned and private enterprises divide the leadership in MIC25 core industries amongst themselves (selection)

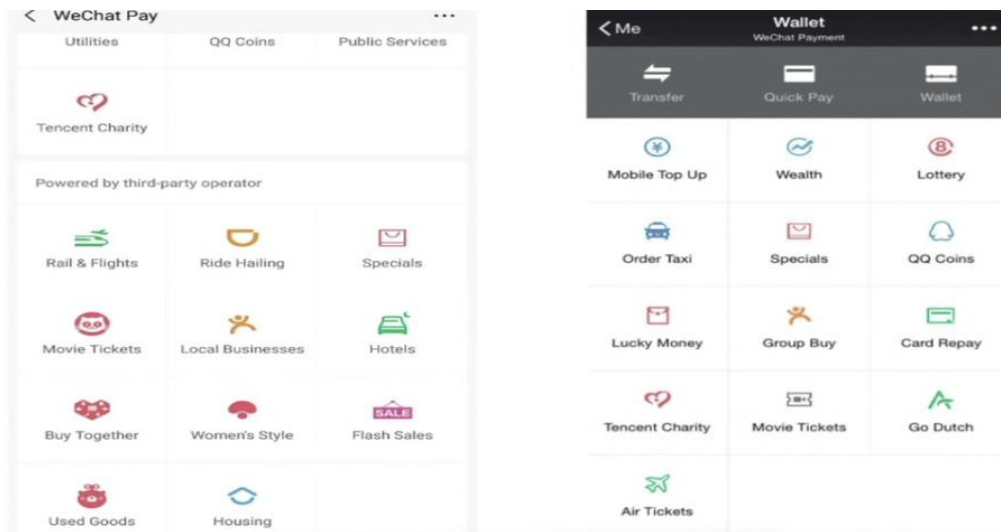
Next-generation IT	Ownership	Business area
Huawei	private	network equipment, consumer electronics (-> smartphones)
ZTE	SOE	network equipment provider
Alibaba	private	AI research as well as all kinds of Internet related services
Tencent	private	AI research as well as all kinds of Internet related services
Baidu	private	AI research as well as all kinds of Internet related services
Beijing Bytedance	private	Internet media, smartphone applications, AI research
Sense Time	private	deep learning and AI research, face recognition technology
Cloudwalk	private	AI research, facial recognition technology
Yitu Technology	private	AI research in relation to health care, finance
iFlytek	private	AI, translation systems, voice recognition
Megvii Face++	private	AI, face and body recognition
Cambricon	private	IC, AI chips, semi-conductors
YMTC	SOE	IC/microchips
Horizon Robotics	private	IC/microchips
HiSilicon Technologies	private	IC
Jiangsu Changjiang Electronics Technology	private	IC packaging and testing
Automation and robotics		
Sense Time	private	deep learning and AI research, face recognition technology
DJI	private	intelligent aerial drones, AI research
Ubtech Robotics	private	humanoid robots
Siasun Robot & Automation	private	robots: industrial, mobile, service; intelligent logistics and assembly systems
Aviation and space equipment		
Commercial Aircraft Corporation of China	SOE	large commercial/passenger aircraft
Aviation Industry Corporation of China	SOE	transport, fighter & bomber aircraft, helicopters, gen. Aviation
China Aerospace Science and Technology Corporation	SOE	spacecraft, launch vehicles, strategic & tactical missile systems
Maritime equipment and high-tech ships		
China Shipbuilding Industry Corporation (CSIC)	SOE	shipbuilding, marine engineering
China State Shipbuilding Corporation (CSSC)	SOE	shipbuilding, equipment manufacturing
Dalian Shipbuilding Industry Corporation (part of CSIC)	SOE	shipbuilding, energy and offshore equipment
COMEC / GSI (part of CSSC)	SOE	shipbuilding; marine, electrical and mechanical equipment

Advanced railway transportation equipment		
China Railway Construction Corporation	SOE	railway construction
China Railway Group (parent: China Railway Engineering)	SOE	infrastructure construction: railways, roads etc.
China Communications Construction Company	SOE	transportation infrastructure: railways, roads, ports etc.
CRRC Corporation	SOE	rolling stock, trains, locomotives
Energy saving and new energy vehicles		
Baidu, Alibaba, Tencent	private	in relation to AD; platform and mobility service
Didi Chuxing	private	platform and mobility service
Pony.ai	private	vehicle construction
WeRide / Jingchi	private	vehicle construction
Horizon Robotics	private	AI chips
Cambricon	private	AI chips
Contemporary Ampere Technology	private	Electric Vehicle Batteries
BYD	private	Electric Vehicle Batteries
OptimumNano	private	Electric Vehicle Batteries
Guoxuan High-Tech	private	Electric Vehicle Batteries
Beijing National Battery Technology	SOE	Electric Vehicle Batteries
NIO	private	Electric Vehicles
Xpeng Motors	private	Electric Vehicles
BAIC Group	SOE	Automotive Industry incl. Electric Vehicles
Geely	private	Automotive Industry incl. Electric Vehicles
Energy equipment		
Hanergy	private	previously hydro power, now solar power
GCL-Poly	private	cogeneration, incineration, wind power
China Three Gorges Corporation	SOE	power generation, hydro-electric power
Goldwind	private	wind power
Jinko Solar	private	solar panels
Guodian Technology and Environment Group	SOE	environmental protection, energy conservation, wind power
Agricultural equipment		
Yito Group	SOE	agricultural machinery
Changfa Agricultural Equipment	SOE	agricultural machinery; tractors, rice transplanters, harvesters
Chery	SOE	automotive, agricultural machinery

Source. MERICS papers on China (2019).

FIGURE J

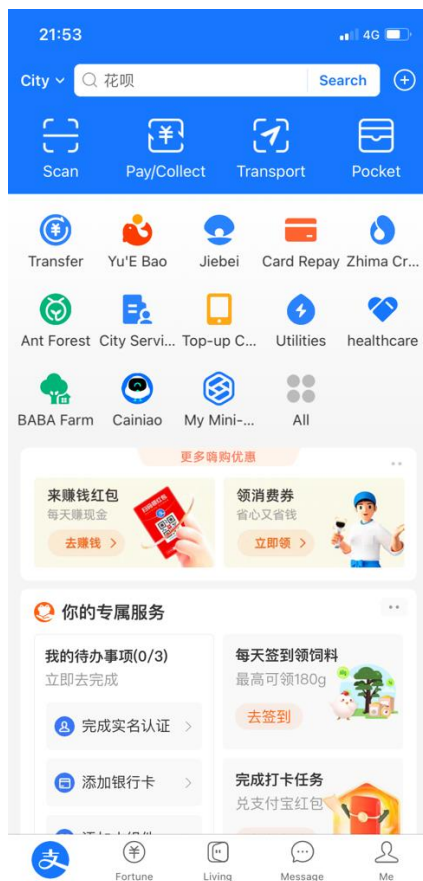
Screenshot of the interface of WeChat (Tencent Group) application



Source. Own elaboration via screenshot (2023).

FIGURE K

Screenshot of the interface of the Alipay (Alibaba Group) application



Source. Own elaboration via screenshot (2023).