TECHNO-NATIONALISM AND TECHNO-GLOBALISM IN CHINA: DEVELOPING AN INNOVATION-DRIVEN ECONOMY WITH CHINESE CHARACTERISTICS

BY

MR. RAFAEL TORQUATO CRUZ

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF POLITICAL SCIENCE IN INTERNATIONAL RELATIONS

FACULTY OF POLITICAL SCIENCE

THAMMASAT UNIVERSITY

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ABSTRACT

Science, technology and innovation (STI) are fundamental forces for the development of prosperous nations and can be linked directly with the construction of national identities. The nurturing of national STI capabilities requires strategic coordination of domestic and international factors and different governments can adopt a spectrum of policies to harness the opportunities of global markets while also protecting their own national interests. In recent years, China has been particularly successful in combining nationalism, globalization, and technological development. The goal of this research is to assess the role of nationalism in China's strategy towards becoming an innovation-driven economy. For such, it reviews scientific literature concerning theories of technological development, which tend to cluster around two opposing poles: one linked to trends of globalism and economic liberalism (techno-globalism) and the other to nationalism and protectionism (techno-nationalism).

Using a constructivist framework to understand the interplay between identity and norms in an international context, the research starts by reviewing key literature on the formation of China to understand the defining characteristics that shape the Chinese national identity and its guiding ideology. After establishing the main theoretical frameworks and observing the People's Republic of China's evolving practices on technology transfer and development, the research analyzes current official

plans to interpret the Chinese government's policy in the 21st century. It studied five consecutive Five-Year Plans for National Economic and Social Development (10th to 14th plan) covering years 2001 to 2025, which reflects the overarching policy of the government for the period. It used a mixed-method, creating a coding system and applying it to five plans to tag different passages according to their ideological leanings. This allowed a quantitative approach to the question of the underlying tones of the text.

The research concluded that China has been consistent in adopting an open and liberal market option to allow for technology transfer and consequent STI development and economic development. However, the analysis does not seem to indicate a broad adoption of the techno-globalist framework either, as a non-isolationist strategy was chosen to boost technological transfer with the long-term goal of achieving autonomy. Such a system could enable China to redefine and construct its national identity as an innovation-driven nation and a global leader. Innovation, therefore, has not only an economic role but is a fundamental piece of a broader civilizational mission.

Keywords: China, policy, techno-nationalism, techno-globalism, national identity, science and technology, innovation, innovation-driven development.

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Rafael Torquato Cruz

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INTRODUCTION

1.1 General Introduction

With the end of the Cold War, many intellectuals and politicians believed that a new age of peace would surge, one where the world would be more interconnected and globalized, and war as a method for conflict resolution would be superseded by mechanisms of international law.[1] Many works on Globalization Theories suggest that, as nations get more integrated into the global market, nationalist sentiments would subdue in favor of a cosmopolitan society. Authors such as Kenichi Ohmae, who can be classified as a hyperglobalist, believes that a new form of social organization would emerge from economic globalization, one that would eventually supplant the traditional nation-state as the primary political unit of the global society (Alden & Aran, 2016, p. 109). What would emerge would be a fusion of corporate and state powers; and foreign policy would be directed by the interests of a transnational capitalist class.

Undeniably, technology plays a significant role in the globalization process. Archibugi and Michie (1995) describe the mutually constructive relationship between technological development and globalization as 'techno-globalism': With the integration of global markets since the late-1970's private companies from developed nations have been using their technological dominance to expand to foreign markets and to establish collaborative international research networks with other companies and universities to enhance research and development (R&D) efforts.

According to Edgerton (2007), with the emergence of new technologies, techno-globalists believe that nations would eventually disappear in favor of the 'global village'. And indeed, with the ubiquitous presence of the internet and advanced transportation and telecommunications technology, the physical and psychological distances between peoples worldwide have decreased considerably. Urban populations

[1] For a review on the different theoretical approaches that discuss the connection between interdependence and conflict, see Barbiere & Schneider (1999).

start to belong to a broader cosmopolitan culture, watching the same Hollywood movies, using the same Samsung phones, driving the same Volkswagen cars, playing the same Nintendo videogames, eating the same McDonald's meals, etc. As never before, the differences between national cultures are being overshadowed by the similarity of habits and lifestyles.

Yet, a critical analysis will point out that the 21st century is far from a global village. The perspective of globalization and interdependence opening the path to a future single cosmopolitan identity is being challenged by the rise of radicalism and tensions worldwide. Ironically, if technology was fundamental to the development of an interconnected world, it has also been instrumental in creating new sources of struggles. For example, social media has enabled the spread of fake news and radical speech globally, with online echo chambers allowing reactionary ideologies to grow unchallenged. Moreover, while some disruptive technologies have provided new employment opportunities, others, such as automation and advanced supply chain logistics, accelerated outsourcing strategies, regardless of the social unrest they generate.

In fact, the nature of unrest itself seems to be changing. In his more recent analysis, Francis Fukuyama (Maitlis, 2018) parted ways from his 'end of history' thesis and tried to reassess his previous perspective by pointing out that, nowadays, we are less defined by economics and more by identity politics. The demand for dignity and social adjustment generated a new wave of conflicts and contradictions within countries with opposing identities facing one another and forming a complex system prone to instability.

One of the most potent sentiments reemerging from this system is nationalism. Many intellectuals have held nationalist views regarding science and technology in nearly every nation, believing that national characteristics shape and have been shaped by technology (Edgerton, 2007, p. 2). According to Kennedy (2013), this nation-centric approach towards technological development was described by Robert Reich in 1987 under the name of techno-nationalism. Since then, many authors have developed this idea. Common to most is the principle that "nation-states [are] engaged in a competitive struggle in which technological prowess is crucial" (Kennedy, 2013, p. 912). Johnson-Freese and Erickson (2006) define techno-nationalism as "the idea

that technological strength is an effective determinant of national power in a harshly competitive world" (p. 12, as cited in Kennedy, 2013, p. 912). Other authors such as Atsushi Yamada (2000) observe that modern techno-nationalism, or neo-techno-nationalism, must adapt to global forces and, therefore, a national technological policy must pragmatically combine state activism with international cooperation and liberal policies (as cited in Kennedy, 2013, p. 12).

Studies analyzing the relation between nationalism and technological development are, however, relatively sparse in the mainstream International Relations (IR) literature. As Edgerton (2007) points out, nationalism is often seen negatively, associated with the likes of militarism and authoritarianism, which is a narrow application of the concept, considering that nationalism has also been central to movements of liberation and anti-colonialism in the 19th and 20th centuries (p. 2).

Furthermore, abstract economic theories often lack the nuance presented by the reality of social-economic dynamics between individuals and communities. Neoclassical economic theories treat economic agents as entirely rational beings, ignoring all the cultural baggage and particularities that each individual has. On the other hand, when some Marxists analyze the tendency of internalization of production through strictly materialist lenses, they might overlook that the capitalist, as an individual, was born and raised in a given nation, and as such, is influenced by its national values. Generalizing theories compartmentalized in isolated disciplines cannot fully explain distinct behaviors and business cultures that mold company-employee relations and preferences for particular organizational models.

1.2 Research problem

China is not free of such contradictions either, as it has been balancing nationalism, economic development, and technological progress for nearly a century. Communist China under Mao had as its goal to modernize the country under Marxist principles: The internationalization of class warfare, anti-capitalism, and anti-imperialism; and to achieve this, the Cultural Revolution aimed at overcoming the traditional institutions of the nation (Hughes, 2006). The post-Maoist reforms of Deng Xiaoping had to redefine the national identity under more nationalist terms, as an

orthodox communist philosophy would be incompatible with a market-based economic development. More recently, a new and contradictory shift is taking place as China aims to consolidate its emerging position as a global leader, with political discourse combining nationalism and economic growth with a traditionalist recommitment to Maoist principles which are, by definition, anti-nationalist and anti-capitalist (Wang, 2017).

President Xi Jinping has also highlighted the role of science, technology, and innovation (STI) as fundamental to achieving China's prosperity and rejuvenation. In 2018, during his speech at the 19th Academician Meeting of the Chinese Academy of Sciences, Chinese president Xi Jinping highlighted the importance of self-reliance and independent innovation as the only way to reach the peak of technological development:

> "We must persist in independent innovation, strengthen confidence in innovation, and strive to enhance our ability for independent innovation. Only self-confident nations and nations can steadily move forward on the road to the future. The tree is tall and leafy, and it is rooted deeply. Self-reliance is the basis for the struggle of the Chinese nation to stand on its own footing in the world. Self-innovation is the only way for us to climb the world's technological peaks." (Xi, 2018)

Studies have been made on the relationship between nationalism and technological development in the catching-up experience of China. A 2013 paper by Andrew B. Kennedy on the Renewable Energy in China has revealed that, following unsuccessful policies to promote technological transfer from the opening to foreign direct investment in the early 1990's, China's 2006–2020 Medium and Long Range S&T Plan (MLP) (China, 2005) initiated a pragmatic techno-nationalism approach. According to the author, this was fundamental to the development of the Chinese technological capabilities in that industry. As the MLP stated, "[F]acts have proved that, in areas critical to the national economy and security, core technologies cannot be purchased" (China, 2005, II.1 Guiding principles). This experience is in line with the National Systems of Innovation (NSI) approach, that technology transfer is not an automatic process. Kennedy (2013) concluded that, while China seemingly broke the

World Trade Organization (WTO) principles by providing protection and subsidies for their local companies, the protectionism paid off: If in 2004 three quarters of all wind turbines installed in China were foreign-made, by 2010, Chinese companies controlled 85% of the market (p. 921).

However, as the author noted, it did not mean that China's STI policy during the 2000's was autarkic, as the MLP also revealed that there was not enough confidence in the domestic capabilities of China at the time, so the document highlighted the importance of technological cooperation for the country. The author's key argument was that China pursued a pragmatic approach towards techno-nationalism, which saw international cooperation as fundamental for China to improve its technical expertise.

This seemingly contradictory discourse that combines self-sufficiency and international collaboration is also present in the same 2018 speech by president Xi, who also highlighted the importance of cooperating with the international community to further national science and technology plans:

> "We must adhere to a global perspective to plan and promote scientific and technological innovation, strengthen international cooperation in science and technology innovation, actively integrate into the global scientific and technological innovation network, increase the level of opening up of national science and technology plans, actively participate in and lead international scientific plans and projects, and encourage Chinese scientists to initiate And organize international science and technology cooperation programs." (Xi, 2018)

Yet, a keyword in this paragraph reveals a significant difference between the previous catching-up phase and the current moment: "lead". Xi Jinping's Government – and many others around the world – seems to be operating from a normative framework different from that of the early 2000s, with nationalism and protectionism becoming somewhat acceptable components of national strategies. Furthermore, emerging technologies such as those associated with Industry 4.0 still offer unmapped potential, and this time China is at the frontline of technological discovery.

1.2.1 Problem statement

Considering these trends and contradictions, the guiding question that this research aims to explore is "How has nationalism been incorporated in the national policies to transform China into an innovation-driven economy?". A comprehensive analysis that understands the particularities and historical context in which modern Chinese nationalism has developed and its effects on national policies is required to answer this question. This analysis should provide a better understanding of what might be expected from the Chinese domestic and foreign policy regarding STI in the coming years. Furthermore, the policy insights from this research might also be informative and applicable to other nations in the Global South.

1.2.2 Research objectives

Considering the problem above, the general objective of this research is:

- To assess the role of Chinese nationalism on China's strategy towards becoming an innovation-driven economy.

Under this general objective, the following specific objectives can be described:

- To describe the nature of nationalism in China.
- To evaluate the influence of national values, identities, and aspirations in the country's policies towards the development of an innovation-driven economy.

1.3 Rationale of the study

To fulfill the research objectives and answer the research problem, this study will be organized as follows:

Succeeding this introductory chapter, a literature review will be conducted in Chapter 2. The first part of the review will present the main concepts relevant to this research, such as nationalism, globalization, and technological development. After discussing those fundamental ideas, the second part of the review will explore the existing academic literature on Chinese technological development. By assessing the

body of academic work through the lenses of the previous conceptualizations, it becomes clear that there is still a gap in knowledge regarding the unique relationship between Chinese nationalism and China's strategy towards becoming an innovation-driven economy.

Chapter 3 describes the research methodology. The analysis will be based on the constructivist theory, as it provides the most suitable theoretical framework to explore the role of identities and perceptions in policymaking. By following the constructivist reasoning, the proposed method of analysis will be implemented in three phases (chapter 4):

i) Inductive content analysis of studies on Chinese nationalism to create an initial coding scheme with the characteristics of Chinese nationalism and China's view on technology;
ii) Deductive category application of the coding scheme to the primary source materials – China's 10th, 11th, 12th, 13th, and 14th Five-Year Plans for National Economic and Social Development; and
iii) Comparative analysis and discussion of the key findings.

Chapter 5 summarizes the results of the research, remaining gaps, and further topics of research.

CHAPTER 2
LITERATURE REVIEW

Given the cross-cutting, multidisciplinary nature of the subject, the literature review of this research is divided into two parts. The first section of the chapter examines the main theories and frameworks that explain the ideas of nationalism and its relation to economic and technological development. Next, the chapter explores the existing academic literature regarding the relationship between nationalism and the technological development of China in the last 20 years.

This review follows a basic methodology of diallelic analysis. It starts by investigating how ideas are constructed and justified by their leading proponents. Once arguments have been fairly presented, an opposing perspective will be explored to highlight contrasting views and scrutinize the initial beliefs. Finally, each part of the literature review is concluded with a synthesis section, evaluating the validity of juxtaposing arguments, highlighting literature gaps, and exploring possible new ideas in the context of this research.

The first part of the review explores the main concepts required to understand and realize the research objectives. Section 2.1.1 introduces different interpretations of nationalism, the evolution of the idea, and how various researchers understand the nature of nationalism in its multiple manifestations. Section 2.1.2, examines how economic activities can be framed in the context of national systems and national interests and how nationalism can be used to advance the economic interests of specific groups and nations. The theoretical explorations on how national STI policies are interconnected with nationalism, characterized in this work as techno-nationalism, is described in section 2.1.3. As a counterpoint, section 2.1.4 delves into the rise of globalization, the major theories of globalization, and how its proponents believe it can support economic growth. Section 2.1.5 discusses how globalization can be leveraged to support technological development, according to the techno-globalist framework. Finally, section 2.1.6 provides a critical assessment of nationalism and globalization in the context of developing countries and its interconnection to the development of national technological capabilities.

Once the fundamental concepts have been investigated, the second part of the literature review will explore the relationship between nationalism and Chinese technological development in recent years. Many researchers have examined the correlation between China's national interests and its national strategy for technological development in specific fields. Section 2.2.1 explores the Realist worldview, which sees China's technological development as a part of a grand strategy for hegemonic ascendancy. In contrast, 2.2.2 explores the Liberal arguments for China's peaceful rise, highlighting China's beneficial participation in global trade, and the economic interest that motivates its technological development. After these contrasting perspectives have been examined, section 2.2.3 presents a synthesis of ideas, emphasizing the paradoxes of Chinese technological development and the existing literature gaps that this research aims to address.

2.1 Theoretical conceptualization

2.1.1 Introduction to nationalism

In its modern approach, the concept of nation tends to be broadly understood as communities that share a state, territory, history, and culture. One of the most influential definitions of the term comes from the historian Benedict Anderson (2008), which defines a nation as "an imagined political community – and imagined as being intrinsically limited and at the same time sovereign" (p. 32). Nationalism emerges from this shared experience of belonging to a nation, and it can manifest itself in the appreciation and protection of the national values, institutions, history, and culture.

Anthony Smith (1991), one of the founders of the interdisciplinary field of nationalism studies, defines nationalism as "an ideological movement for attaining and maintaining autonomy, unity and identity on behalf of a population deemed by some of its members to constitute an actual or potential 'nation'" (p. 73). Eric Hobsbawm, in his seminal work "Nations and Nationalism since 1780" (2012), asserts that the basic characteristic of the modern nation and everything connected to it is its modernity. Therefore, the author credits the emergence of nationalism to revolutionary, democratic, and civilian movements in France and the United States during the second half of the 18th century. According to Hobsbawm, such movements acquired a cultural

and ethnolinguistic connotation as they evolved, until finally becoming viable political projects for the creation and strengthening of newly-formed states during the 19th century. Similarly, Max Weber and Emile Durkheim, qualify nationalism as a source or form of political integration. They see the construction of a nation as a crucial component for the creation of an effective modern society that is capable of political stability and economic development. In this sense, nationalism is an expected reflection of the industrialization processes and the formation of modern states, though power relations and manipulation by the state's elites can also affect it (Calhoun, 2008, p. 50).

For other scholars, nationalism is mostly an outdated instrument for mass mobilization. Jürgen Habermas (1995) argues that nationalism has no more space in the current pluralistic societies, and cultural homogeneity perceptions are dangerous paths leading to xenophobia and violence. Instead, he proposes that the loyalty of citizens should no longer be to their national identity but to the constitutional rules and values of their liberal democracies, which he calls constitutional patriotism.

According to Sutherland (2011), one of the central debates of classical theories of nationalism revolves around the issue of origins and can be categorized into two main groups, modernists and ethno-symbolists (p. 25). These ideas are not necessarily mutually excluding; instead, they differ in what factors should be emphasized to describe the formation of nations.

Modernist theorists believe that humans choose and construct their identities according to the situations in which they find themselves (Smith, 1995). In this regard, there is no fundamental essence in ethnic communities, as they are not based on history or human nature but are a set of malleable symbols and organizations in constant adaptation, used by individuals and elites in order to achieve goals within a state.

Modernist theorists, such as Ernest Gellner (2000), see the birth of European nationalism as a response to the transformations started by the modernization of agrarian societies. Culture in the lower levels of such communities was spread informally through interactions between peers, while culture in the upper castes was also spread by alphabetization and education. Often, the aristocracy used a different language than the lower classes, making these worlds mutually unintelligible. Consequently, a common culture would rarely become a valid foundation for the

formation of political units. Rulers had no incentive to spread universal education or create a common culture – quite the opposite – the cultural differentiation was beneficial. It made it easier to keep groups within their designated contexts and inhibited extended loyalties (such as to a broader nation) that might challenge the ruler's power.

In contrast, the modern industrial society is organized in a way that not only promotes nationalism but depends on it (Gellner, 2000). The modern economy is based on the expansion of productivity and technological innovations – nature is manipulated to produce wealth, and the food supply is abundant. The nature of work has also changed: While agrarian societies were supported by simple manual labor, a prosperous modern society can only be maintained by an educated population capable of executing advanced tasks.

Production and workers are managed using complex language, codes, and communication technologies that should be comprehended universally, regardless of the context in which they originated. Regional dialects and unintelligible symbols would make these operations impossible, which motivated the spread of universal education and a common cultural framework. The elite culture, already based on alphabetization and education, was disseminated as the national culture. Access to this "superior" national culture became a requirement for individuals to benefit from employment, legal and moral citizenship, and partake in all kinds of social activities. The individual would then identify with this national culture and wish to be a part of a political entity with the same cultural identity.

Reproducing such a system is, however, extremely expensive. Promoting this national culture requires an overreaching universal educational system that only the public sector can afford to maintain and guarantee quality. For this reason, Governments in industrial societies gain their legitimacy by promoting economic prosperity and protecting their national culture. In sum, a national culture needs a state to prosper and compete with others; hence, one culture, one state.

While modernists emphasize the construction of nations and promoting nationalism as a pragmatic strategy for social-economic modernization, ethno-symbolists authors see those cultural identities as originated much earlier than the industrial revolution. Authors such as Anthony Smith (1991; 1995) believe that, at a

collective level, ethnic organizations have always been central to human associations and remain relevant among descendants of the original community even after conquests.

Ethno-symbolists argue that, even if the doctrine of national self-determination is recent, nationalist feelings of some sort can be observed since ancient times. According to Moore (1917), there was a notion of national belonging in Ancient Greece which separated the Greek people from the “barbarians”. Additionally, in moments of tension, it was possible to identify a strong nationalist feeling from the citizens towards its City-States, as it can be noted in Pericles' Funeral Oration. In another case, in one poem from the Jôjin azari no haha no shû anthology, written during the Heian period of Japan, Jôjun Azari’s mother prays for his son to never forget the “land of the rising sun”. Even in the diary of the monk, which went to peregrinate in China at 1072, his nationalism is shown in the use of expressions such as “The Great Japanese Nation”, as to set a level of equity with “The Great Song Nation”, or in his description of the Imperial Family’s divine origin (Borgen, 1998).

Anthony Smith (1995) points out that national sentiments that transcend ethnic ties were already present within several European states' small clerical and bureaucratic classes as early as the 14th century, which is a manifestation of old, continuous nations far earlier than modernists expected. He argues that one cannot equate nation-building with state-building, as the establishment of incorporating state institutions might not necessarily form a national mythos accepted by all, leaving a large parcel of the population alienated. This is the case of many newly independent ex-colonies, in which the assimilative power of the modernizing state failed to prevent ethnic antagonisms that threaten their own existence. Furthermore, not only does nationalism predates modernization, but it also remains in continuous evolution even in already advanced, post-industrial societies, negating the perception of it being simply an instrument for modernization (Smith, 1995, pp. 37-41). According to Michael Billig (1995), nationalism is very much alive and present in everyday life of people, in actions such as the use of flags and sportive events. This ordinary use of nationalist elements is an exercise of identity formation and contributes to a view of the world as organized in terms of nations and national identities (p. 208).

Yet, the argument of national identities based on the centuries of accumulated ethno-cultural myths and symbols is less explicative when it comes to the new multi-ethnic American nations that emerged from the decolonization of the continent during the end of the 18th century to the early 19th century. Those countries were composed of communities that suddenly became part of a new sovereign territory despite being culturally diverse and vastly distant geographically. Despite perennial social inequalities, horizontal equality regarding national belonging in this new social arrangement is established, as all citizens are equal in being a part of the nation. Benedict Anderson (1994) explains this phenomenon as the creation of "imagined communities": While agreeing with Smith's point of nationalism possibly being based on pre-existing cultural traditions, Anderson argues that the idea of collective belonging to such communal tradition is an imaginative effort. Such communities are real constructions, but they exist only as immaterial ideas rather than physical entities.

In his view, the history of modern nationalism can be traced back to the independence of American nations from their imperial centers, which had been shaped by two phenomena: the self-awareness of the American-born Europeans and the advance of mass communication. The position of white Europeans born in the colonies was paradoxical: They were believed to be Spanish, Portuguese, or English, while at the same time, perceived as second-class people by their European-born counterparts. As most had never been to Europe, they became culturally distinct, developing particular costumes related to their homeland instead. Furthermore, metropolitan governments restricted their access to high-level bureaucratic positions, reinforcing a sense of alienation and separation. The dissemination of the printing press further nurtured the development of new communities in the colonies by providing access to the same information and worldview. It also helped homogenize the language, enabling communities to feel connected through shared histories despite geographical distances.

2.1.2 The economics of nationalism

It could be argued that linkages between economic development, technological progress, and nationalism have been explored already by the mercantilist policies adopted by the European nations between the 15th and 18th centuries. However, the beginning of economic nationalism as a development strategy can be traced to

Alexander Hamilton and Friedrich List (1986) during the late 18th century. Both were very influential in the industrial debut of their countries (United States and Germany), while also profoundly influencing the principles adopted by the Meiji Restoration in Japan and its subsequent effects on Asia. Their theories opposed the international norms of free-market, cosmopolitanism, and economic individualism promoted by the United Kingdom at the time. They believed that the economy should be grounded in a national system because, while individuals work towards their self-interests, only the state can operate for the benefit of the entire nation. Therefore, they advocated for measures to protect emerging national industries and public investments in national infrastructure to boost national competitiveness, addressing each nation's specific necessities and particularities.

2.1.2.1 National system of innovation

A more recent interpretation of Hamilton and List's theories is the National System of Innovation (NSI) approach: An evolutionary economic approach that studies technological progress and the processes of convergence and divergence between advanced nations. The basic idea of the NSI is that the development, introduction and dissemination of technologies and productive knowledge is organized differently within each country's national borders and has an effect of path creation. The adaptability and institutional changes of a country are crucial to the successful diffusion of new technological systems. Nations vary in their dynamic potentials, and even virtuous cycles of growth and national specialization can denature in vicious cycles at the long run, given the convergences and divergences between elements and subsystems, as these factors are not independent.

This theoretical framework is built upon three pillars: The first is the Schumpeterian tradition, which highlights the strength of endogenous technological progress and its role as a disruptive mechanism to the economic balance. The second is Simon's concept of limited rationality, which states that companies act based on imperfect calculations, as decision-makers do not have all the information and do not know all the consequences for each decision. Lastly is the economic interpretation of biological concepts, including Darwin's theory of natural selection and Lamarckian inheritance of acquired traits to a market environment (Teixeira, 2008).

Proponents of the NSI framework argue that technological advancement is one of the main driving forces for national economic development. According to Burns (2009), technological development consists of improvements in techniques (including organization of companies) with which products and services are produced, marketed, and delivered to end-users. Multiple stakeholders are engaged in a given NSI: Research and academic institutions, corporations, start-ups, government institutions, and civil society. These stakeholders can simultaneously hold both unique and partly overlapping roles concerning producing and implementing tangible outputs and establishing normative and policy frameworks.

While science, technology, and innovation (STI) development can be understood as an integrated life-cycle system (OECD & Eurostat, 2018), firms are considered the main actors responsible for diffusing new knowledge and products to society at large. Companies can create new technologies and innovations through research and development (R&D) activities, or the adaptation and application of existing technologies through technology transfer mechanisms. The outcomes of innovations can be both private, as profits stay largely within the firm that commercializes these innovations; but also public, to the extent that benefits may spill over to the public in the form of new consumer goods, business opportunities, employment, and tax revenue (OECD & Eurostat, 2018).

Other perspectives emphasize different aspects of technological development. From a state-centric perspective, technological development is a strategic national interest, emerging from the knowledge produced in educational institutions and companies, and mostly restricted to the place of creation. Furthermore, technology is also crucial for fostering human development and providing soft and hard power to states. Governments can enhance these processes by implementing national STI policies, which provide an overarching policy mix of financial, institutional, and normative instruments to guide and boost national STI development. Numerous factors can influence these policies, such as specificities of the national context and lobbying from domestic groups of interest.

Furthermore, since STI efforts from the private sector are profit-driven, firms tend to engage less with costly, long-term investments with higher risks, such as basic medical research or renewable energy. To address these shortcomings,

governments can enhance STI development by providing financial incentives such as tax-exemption and research subsidies and creating institutions and policies to improve the effectiveness of both capital and labor markets (Westmore, 2014). Moreover, the public sector does more than address market failures: Numerous fundamental breakthroughs and technological platforms such as the internet have resulted from government-driven R&D (Mazzucato, 2013). As sovereign entities with taxation rights, vast benefits of scale, and a mandate to oversee the welfare of their citizens, governments are among the only entities that can successfully engage in fundamental research that may have benefits beyond the return horizon of most private markets.

2.1.3 Techno-nationalism

Intellectuals have also been quite nationalist about science and technology in nearly every nation, as national characteristics shaped (and have been shaped by) the adoption and mastery of key technologies (Edgerton, 2007, p. 2). Robert Reich, in 1987, has called this nation-centric approach towards technological development techno-nationalism. According to him, techno-nationalism is an ideology that emphasizes the promotion of independent national technological and scientific development as a means of gaining competitive leverage in economic and military fields towards other nations. Reich further argues that, since STI are fundamental determinants for national prosperity and security, nascent industries should be protected from global competition. Akin to a sort of technological mercantilism, the inflow of innovations should be promoted and directed towards building national technological capabilities, while the outflow of technologies must be controlled (Reich, 1987, as cited in Li, 1994, p. 2)

Since then, many authors have built upon this idea based on the premise that “nation-states [are] engaged in a competitive struggle in which technological prowess is crucial” (Kennedy, 2013, p. 912). Arguably, the most influential work on techno-nationalism has been Richard Samuels’ seminal work "Rich Nation, Strong Army: National Security and the Technological Transformation of Japan”. Samuels explains techno-nationalism as the belief that “technology is a fundamental element in national security, that it must be indigenized, diffused, and nurtured in order to make a nation rich and strong” (Samuels, 1996, p. 33). As a development strategy, techno-nationalism argues that self-sufficiency can be achieved through the exploitation of

imported technology, allowing a nation to gradually evolve from learning and imitating to eventually developing their autonomous technology capabilities (Bitzinger, 2015, p. 458). This model is quite evident in the modernization policies adopted by Japan during the late 19th century (as contextualized in Box Error**! No text of specified style in document.**.1) and arguably continues to be a contributing factor to the country's success ever since.

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Protectionism and autonomy in early Japanese development

Before its modernization endeavors during the Meiji Restauration, Japan's policy of *Sakoku,* adopted in the 1630s, essentially isolated the country from the rest of the world, with trade limited to a handful of Chinese, Korean and Dutch merchants.

However, this seclusion policy has abruptly halted by the arrival of US steamships led by Commodore Perry, forcing Japan to open its ports to trade in 1854. Soon, other trade deals were made with other Western nations and more ports were open, further highlighting the perceived weakness of the Japanese Government and the need for quick transformation in the whole political economy of the nation. The sudden opening to the global markets also affected the domestic economy. Imports of cheap cotton textiles, yarn, and other industrialized products brought a steep fall in their prices, while the increased demand for raw silk, egg cards, rice, and tea caused their prices to spike (Allen, 1983, p. 29).

In 1868, the Meiji Restauration movement overthrew the old regime, and the modernization of Japan became the national priority. Reflecting on the expansion of Western imperialism in the region, Japanese policymakers came to believe that "national development was a matter of autonomy" and independent knowledge was as crucial to the country's security as military power (Samuels, 1996, p. 43).

Trade was crucial in the modernization strategy of Japan as the country needed foreign currency to import modern armaments, consumer goods, and pay for international loans. However, global engagements also posed the risk of unfair

competition with international products and long-term indebtment and dependence. As tariff barriers were not an option due to the unequal trade treaties, the Government had to use unorthodox measures to support domestic industries and promote exports in the face of foreign competition. At first, Japanese merchants were hesitant to take the role of industrialists, leaving the state as the main driver of the economic change (Macpherson, 1995, p. 33). The Government took an active part in buying domestic products like rice, tea, and silk and exporting them, while also establishing local factories for construction materials and armaments to substitute imports.

During the mid-1880s, private-owned companies gained preeminence, whilst still being heavily supported by the state. Many of the state-owned factories were privatized during this period, and generous financial and technical support was given for new companies to be established by Japanese citizens. For private actors who wanted to take an active role in trade, the Government granted subsidies for them to set up trading companies and acted as an intermediary and guarantor for foreign buyers. The state also helped Japanese companies open offices in foreign countries, to which the Japanese Government could commission exports of goods such as tea and silk products (Horie, 1952, p. 7).

Backed by an extensive historical review of the Japanese industrial development, Samuels structures his analysis of the techno-nationalist policy cycle into three elements: (l) import-substituting indigenization — the identification and acquisition of foreign products and manufacturing/design processes to stimulate local development; (2) diffusion — the distribution of this newly acquired know-how throughout the economy; and (3) nurturance – the cultivation of the capacity to innovate and manufacture nationally (Samuels, 1996, p. 33).

Import-substituting indigenization refers to developing national technological capabilities through active promotion of technological inflows and continuous productive learning. The process begins with identifying the technological gaps and production bottlenecks in the national productive system. The government then actively supports efforts to import certain technologies, products, materials, and machinery that are not produced domestically. While the emphasis on imports may appear contradictory at first, the final goal is to cease national dependence on foreign

licenses, achieve autonomy on equipment production and, finally, develop national innovations to compete in the global market of technologically advanced products. For that, the government provides financial and technical support to the national production of imported goods. This strategy has been employed particularly on dual-use technologies with military and civilian applications. Even if the initial replacement attempts are of less quality than original ones, the continuous cycle of production and re-iteration eventually enables national producers to master the targeted technology and then develop it further independently (Samuels, 1996, pp. 45-46).

Once import-substituting indigenization is achieved, the newly acquired knowledge is then spread throughout the national productive system with concerted R&D efforts to adapt, assimilate, and diffuse said technologies. Governments can act directly through state-owned enterprises or support private firms using subsidies, procurement, and other mechanisms of indirect promotion. Technology diffusion also happens horizontally in the private sector through means like research consortia, including basic research, systems development, and device manufacturing. Such conjoint effort allows participants to pool resources and lower individual risks, allowing for more daring projects and strategies and more overall efficiency than would be displayed if actors worked separately. It also allows competing firms to jointly develop a common technical base before competing in the market. Furthermore, diffusion also happens through subcontractors, which could develop new processes or skills through independent research activities and practices (Samuels, 1996, pp. 50-53).

The last pillar of Samuels's techno-nationalism is nurturance, which refers to the purposeful cultivation of a harmonious ecosystem of companies and supporting institutions (akin to the idea of an NSI). According to Samuels, this ecosystem should shield the national economy from threats to long-term productivity, such as market shifts and technological revolutions. At the same time, it should also prevent unbeneficial competition in the internal market that could otherwise result in wasted economic or non-economic resources and overall societal unbalances (Samuels, 1996, pp. 52-54).

Adequate nurturance requires creating protocols that encourage communication between different firms, subcontractors, government agencies, and other institutions. Legislators may enforce such protocols, but not necessarily, as the

techno-nationalist ideology itself can influence actors' decisions even in the absence of orientation by a public policy: Techno-nationalist firms are more likely to cultivate a domestic supply chain and cooperate locally to maximize the benefits of their activities to the national economy (Keller & Samuels, 2003, p. 9). Protocols can also be used defensively: For instance, specific institutional arrangements, cultural barriers, and even language had served to hinder foreign companies from registering their intellectual property in the Japanese patent system (Archibugi & Michie, 1995, pp. 126-127).

Through nurturance, an overarching national interest becomes in itself a constituent part of the national innovation system of a country, promoting not only the development of technological capabilities, but also social harmony at the national level. However, these nationalistic practices may be incompatible with the modern liberal methods of optimizing resources and production through market mechanisms and outsourcing. It may also clash with institutional frameworks that rule international trade, such as the World Trade Organization (WTO).

Fundamentally, Samuels's conceptualization of techno-nationalism provides a remarkable framework to understand how nationalism, as an ideology, can impact the technological development of a country. His analysis is accompanied by a comprehensive historical understanding of Japanese industrial, trade, and STI policies since the Meiji Restauration. Nonetheless, some scholars challenge his nation-centric view of technological development. For instance, Atsushi Yamada (2000, as cited in Kennedy, 2013) observes that modern techno-nationalism, or what he calls neo-techno-nationalism, needs to be tailored to also benefit from globalization forces. In such a view, a national technological policy must pragmatically combine state activism with international cooperation and liberal policies.

Bitzinger (2015) is particularly critical of the exaggerated focus on military technology that seems to permeate techno-nationalist strategies, which, he argues, is centered on emotional appeal to nationalism rather than on solid industrialization needs. Hence, the techno-nationalist agenda is criticized for inducing lousy allocation of resources to replicate well-known military technology already available at the global market:

> "The technonationalist strategy results in a considerable amount of effort and resources being wasted on 'reinventing the wheel', that is, replicating weapons systems (combat aircraft, armoured vehicles, assault rifles, even missile systems) that are widely and more cheaply available on the global arms market. At the same time, techno-nationalism comes with some very high opportunity costs: countries pay a premium for autarky in armaments acquisition, while also risking losing access to global dynamics of technology diffusion and innovation." (Bitzinger, 2015, pp. 467-468)

Others are less inclined to place technology at the center of international competition, highlighting the opportunities for international collaboration instead. Nakayama (2012) goes a step further, criticizing the techno-nationalistic ideology as a hindrance to actual development. For him, "as countries developed their own technology for their own sake [during the Cold War period], the technology gap and differences in the standard of living seemed as if they would continue to widen" (p. 14). Nakayama argues that the optimal way for developing countries to industrialize is to take advantage of their cheap labor to manufacture products and export to wealthier markets. Since multinational corporations invest their capital seeking cheap labor and low regulations, governments should adopt pro-globalization policies to encourage FDI and potential transnational technology transfers between foreign and local staff. The techno-globalization trend, the author concludes, is set to reverse the technology gap and promote further equality among nations; thus negating assertions such as those made by the dependency theory (pp. 13-14).

Moreover, in contrast to the techno-nationalist characterization made by Samuels, it can be argued that Japan has since transitioned to become an avid advocate for free-trade and global markets. As of 2020, Japan has a total of 21 Free Trade Agreements (FTAs) and Economic Partnership Agreements (EPAs) in force, with three more under negotiation. Most notably, Japan was still championing the Trans-Pacific Partnership (TPP), even after its main architect, the United States, abandoned it: During the regional Comprehensive Economic Partnership (RCEP) talks, then prime-minister Abe stated that Japan would demonstrate its leadership in negotiations and be at the center of the expanding free trade zone (Akiyama, 2020). Still, advocating for

globalization at an international level does not necessarily confirm the abandonment of techno-nationalist practices at the national level.

But even if the claim that the global technological gap is lessening may spark skepticism, it is unquestionable that globalization and the liberal order have become mainstream since the 1990s. In this regard, the following section shall explore the topic of globalization further.

2.1.4 Rise of globalization

Drastic transformations in global affairs that started in the 1990s catalyzed the rejection of the "old" values such as nationalism and national interests. In the International Relations field, this shift led to the revitalization of the liberal schools of thought, with a particular interest in the rise of globalization. Authors Held and McGrew (2007) provide insight into globalization from different dominant perspectives called hyperglobalist, transformationalist, and skeptical.

From the hyperglobalist perspective, globalization is understood as a legitimate and uncontrollable historical process leading to a new era in the development of civilizations, with a world order based on the markets and supranational institutions. This process is described as progressive and socially desirable, as the intensity and dynamics of ongoing changes in the economic sphere would lead to changes in the core structure of social relations. One of the leading representatives of hyperglobalism is Kenichi Ohmae, who argues that, with the growth of global markets and technological progress, globalization has destroyed all previously established hierarchical structures, so the role of the nation-states in this context has been significantly diminished (Ohmae, 2005). On the other hand, multinational enterprises (MNEs) concentrate huge resources and are becoming the main carriers of global economic activity. In time, this shift is set to create a global civilization with markets fully integrated globally, and MNEs would become the main actors in economic activities and international institutions, replacing the role of national states.

Transformationalists have a more moderate view of globalization outcomes' progressiveness than hyperglobalists. For them, globalization does not follow linear progress; instead, it represents a trend of capitalist expansion, therefore being subject to its cyclical nature. The underlying influence of globalization on socio-

economic developments is not questioned, but globalization is not to be understood as deterministic since its final effects are uncertain. Other transformationalist authors such as Giddens, Scholte, Castells, and Walerstein also identify a transformation in the nature of national governments, which are experiencing an ongoing process of reconstitution and restructuring. They also understand that a new world order architecture is developing, although the exact nature of stratification patterns is still unclear (Held et al., 1999; Stefanović, 2008).

The third theoretical perspective expresses skepticism regarding the omnipresence of the globalization process. Authors of this stream, such as Held, Hisrt and Thompson, emphasize that the contemporary global economy's level of integration and openness is not unique in history since trade and international capital flows had been well developed in the pre-1914 period already – the first wave of globalization. Moreover, instead of believing that the diminishing power of the nation-state and the hierarchy of nations are the causes of globalization, they emphasize the role of national actors in the pursuit of economic liberalization and the promotion of cross-border activities. Furthermore, the development of regional blocs as a feature of the modern world economy may suggest that the world economy is less integrated than it was in the late 19th century in some aspects (Held & McGrew, 2007).

2.1.5 Techno-globalism

According to Ostry and Nelson (1995), the concept of techno-globalism was first coined during the 1980s. It denoted a production strategy where MNEs take advantage of their technological edge to penetrate foreign markets while also acquiring and creating new technologies through a network of global technological collaboration (p. 24). In other words, the overall techno-globalist ideology is based on the premise that, in a world of MNEs and foreign direct investment (FDI), trade should be liberalized in order to integrate developing nations in the global value chains. By investing in a foreign market, MNEs provide resources, know-how, and technologies that would not be available in the receiving country otherwise, thus promoting a spill-over effect on the local economy. China is often quoted as a prime example of a country that benefited from such integration, which enabled it to become the “world’s factory”.

The rise of ICT technologies and the overall ubiquity of the Internet has allowed for the internationalization of production and R&D initiatives by MNEs to an extraordinary degree. As described by the World Bank (Hallward-Driemeier & Nayyar, 2017), the ICT revolution helped MNEs internationalize manufacturing activities while maintaining close control of the operations. Consequently, MNEs were more willing to engage with global value chains (GVCs) rather than retain a Fordist vertical productive integration strategy (pp. 42-43).

Furthermore, globalization enabled MNEs to exploit their technological innovations further through trade, patents, royalties, licensing deals, and outsourcing production. From the standpoint of developing countries, a techno-globalist strategy of opening and deregulation could provide them with a swift influx of capital, industrialization, and technology transfer. From such arguments, we can identify the underlying techno-globalist ideology, which considers private entities, mainly MNEs, and subsidiaries, as the main actors driving technological development. The techno-nationalist principle of public policies prioritizing national industries (often despite quality and efficiency issues) to acquire technological autonomy is rejected; public policy should, at most, facilitate international exchanges and improve market efficiency.

Since techno-globalism goes beyond nationalistic interests, techno-globalist policymakers and MNEs also focus on the cooperative development of innovations to address global, transborder issues. Therefore, technological development should be pursued as a collective effort by multinational groups of institutions, such as universities, research laboratories, and business firms, interlinking stakeholders throughout the globe. This cosmopolitan argument assumes that science and technology experts can establish a common ground and solve global problems despite their national differences (Li, 1994, p. 3).

Daniele Archibugi and Jonathan Michie (1995) dissect the idea of techno-globalism in three different facets: (i) global exploitation of technology; (ii) global technological cooperation; and (iii) global generation of technology (p. 125).

Global exploitation of technology is the practice of MNEs from developed countries to sell their innovations to foreign markets in what could be considered the technological equivalent to international export flows. Since technology-intensive

products are more likely to be traded internationally (Guerrieri & Milana, 1995, as cited in Archibugi & Michie, 1995, p. 125), the practice is associated chiefly with high-income economies that invest considerably in R&D activities and, therefore, are routinely able to create products that are both innovative and technologically advanced. An example of this is the revenue generated by the commercialization of intellectual property through patents and licenses.

Global technological collaboration refers to the cross-border collaboration between private or public entities. In some contexts, companies benefit from sharing know-how with competitors in other countries. This inter-firm collaboration usually happens between companies from developed countries working on frontier technologies. It is motivated by reducing the period of innovation and improving their long-term positioning for future market opportunities (Hagedoorn et al., 2000). Still, the collaboration between academic institutions and governments is much more common. The authors point out that the non-profit sector has traditionally been more open to collaboration and knowledge diffusion and that the academic community has become considerably internationalized.

Finally, the global generation of technology refers to MNEs increasing the international integration of their R&D and technological activities – internationally interdependent laboratories (IIL's) being a prime example of this dimension of techno-globalism (Archibugi & Michie, 1995, p. 125). IILs are tasked with carrying out R&D projects assigned to them by the group's R&D management, being one of many similar units working in related activities. These labs are usually acquired by larger corporations by merger or acquisition and are used for advanced R&D tasks rather than downscaling or less innovative work. They act as local links to an international corporate research web, a distributed but centralized network of labs coordinated by a larger node that collects, evaluates, and combines complimentary results.

2.1.5.1 Technology acquisition in developing countries

Technology acquisition is still part of a techno-globalist development strategy; however, rather than being treated as a first step to address a strategic national technological gap, techno-globalists understand technology acquisition as a continuous learning process that occurs naturally between firms through technology transfer

mechanisms. State intervention is usually limited to providing public goods and services, such as educating the workforce. Public R&D, if needed, is usually limited to basic research only, while applied research related to products or processes is kept to the private sector (Keller & Samuels, 2003, p. 11). Notably, there is no overarching political strategy for technological autonomy, as interdependence is seen as a benign aspect of a globalized world.

The interaction between MNEs and local subsidiaries also drives technological accumulation through learning by doing, as the execution of STI-related activities over a long period naturally brings about increasing skill and knowledge that can eventually produce mastery and autonomy of said technology (Chesnais, 2010, p. 256). The transfer of technical know-how occurs organically when workers with similar objectives interact physically at offices, factories, science parks, technology centers, etc (Corsi & Kudrya, 2012). This process is also cumulative by nature, as learning capabilities increase gradually, allowing for progressively more complex knowledge to be acquired. Nonetheless, while technology transfer mechanisms can benefit both MNEs and the host country, they also have explicit and implicit costs. Technological development requires considerable investments, so businesses are keen to protect their intellectual properties. For this reason, technology often flows on the controlled intra-firm streams of parts and goods. Countries outside these networks will only benefit from them by supplying raw materials or acting as lower-level subsidiaries (Chesnais, 2010, p. 280). For example, export prohibition clauses are one of the most common limitations to technology transfer. It is used in technology market agreements, such as sale and license of patents or in the relationship between a parent firm and its subsidiary, and it assures that the IP rights are supplied on the condition that the subsidiary adheres to a restricted operational mandate and market area (p. 280).

Furthermore, developing countries are constantly competing to receive and retain the investments of these MNE, which could promote a ‘race to the bottom’ with concessions and deregulation. Partially due to such trade-offs, some argue that globalization has been less impactful to technological development than previously expected. As observed by Montresor (2001):

> "The relevance of aspects of techno-nationality, such as the idiosyncratic role of history, the social shaping and construction of technology, the cultural basis of the relevant cognitive frameworks, and the institutional nature of the market, are all indicates that the globalization process has not affected technology as much as it is usually retained. Although MNEs and even international organizations have acquired an important role in supporting technology, they do not completely substitute national institutions and policies, of which they rather leave, or even require, a co-ordination role. Therefore, the fact that both state and nation specific technological aspects still matter, implies that STI policies are still relevant even in a phase of increasing international integration." (p. 410)

2.1.6 Nationalism, globalization, and technological development: a critical assessment

Globalization may have supported economic development in many regions, but it has also left many people behind. Disappointments with the outcomes of globalization have generated a renewed interest in nationalist movements of all sorts. One of the faces of this rhetoric has been former White House Chief Strategist Stephen K. Bannon, a self-declared conservative, right-wing and economic nationalist (interview to CBS News by Rose, 2017). In his opinion, the recent nationalist trend has been motivated by the detachment between the globalized corporatist elites in power – or globalists, as he calls – and the disenfranchised working class who feels unrepresented and dissatisfied (in interview to Bloomberg Politics by Micklethwait, 2018):

> "At the 19th century, what built America is called the American system. From Hamilton to Polk, to Henry Clay, to Lincoln, to the Roosevelts; A system of protection of our manufacturing, a financial system that lends to manufacturers, […] and the control of our borders. Economic nationalism is what this country was built on." (Rose, 2017)

Nonetheless, when examined closer, some puzzling inconsistencies appear. While traditional economic nationalism advocated for protectionism and national

systems, the labels of “conservative” and “right-wing” are commonly associated with neoliberal policies of deregulation and minimum state. Historically, nationalism has been be associated with right-wing politics, xenophobia, fascist movements in Europe, military dictatorships, and the suppression of individual freedoms. Paradoxically, nationalism has also been associated with populism and protectionism, which are against the liberal principles of economic freedom. Those inconsistencies suggest that the discussion of nationalism is full of paradoxes, as the concept itself is loosely defined and carries heavy baggage of controversy and misconceptions.

A further argument can be made that the generalizing nature of mainstream theories of International Relations often overlooks the contextual uniqueness that shapes each nation’s nationalism and its manifestations. Such concern might hold particularly valid for the Global South, as some argue that the academic production about nationalism and globalization can be overly Eurocentric (Doyle & Pamplona, 2008, pp.17-20). Important insights can be gained from other areas of the world, beyond Western history and concepts. For instance, a broader assessment of nationalist movements around the globe shows that the automatic association of nationalism as a force for unilateralism and violence is unawarded: The 19th and 20th centuries were marked by popular nationalist movements fighting for peace, autonomy, cooperation and freedom. Leaders such as Gandhi, Sukarno, Aung San, Nasser and Mosaddeq have been identified as nationalists and populists, yet their contributions have been essential for their people's freedom and development. Moreover, their struggle against international interventionism led to the Bandung Conference and subsequent Non-Aligned Movement, where nationalist leaders joined forces to articulate an autonomous path for the Global South.

Regarding the relation between globalization, nationalism, and technological development, no solid historical evidence has been found of a country that has maintained the status of a high-income economy without artificially creating long-term national comparative advantages by investing in its national technological capabilities. Even when developing nations get integrated into the global value chains, most of the value-added in a product comes from the design and intellectual properties created in developed nations. For example, the import-substitution strategy applied in Latin America during the second half of the 20th century suggests that it is not enough

to install factories in the national territory: Without developing domestic technological capabilities, the country will still be dependent on foreign machinery and technology, and if, for any reason, they become unable to acquire the required supplies from abroad (material or intellectual), the productive infrastructure would crumble. This experience seems to corroborate the idea that a national economy centered around commodities and the low-value part of the production tends to remain dependent on the technological production of the developed nations and vulnerable to the deterioration of the terms of trade, therefore unable to fully develop (CEPAL, n.d.). As highlighted by Chesnais (2010):

> "The only way of attempting to ensure the cohesion and interactiveness of production and innovation systems is to build upon national institutions and on small domestic firms. MNEs can be incorporated into the policy to the extent the national environment has strong elements of cohesion; MNEs should not be given the role of pillars in national competitiveness; in some cases, it may be preferable not to call them in at all." (p. 291)

On the other hand, national interests and the desire for autonomy seem to have had a direct influence over the development path chosen by many technologically advanced nations. Explaining techno-nationalism in Asia, Adam Segal and David Kang (2006) described it as "the desire of Asian states to free themselves from dependence on Western technologies" (as cited in Kennedy, 2013, p. 91). As discussed in section 2.1.3, the idea of technology as a crucial component for national security was central to Japanese modernization in the late 19th century – and possibly remains in the minds of Asian leaders up to this day. For instance, the clashes between Japan and Korea over the contested maritime territory of Dokdo/Takeshima reveal how national identities and interests can still supersede economic interdependence (Koo, 2010). Those two countries seemingly have all the ingredients to develop a friendly and cooperative relationship: an intense economic interdependence and many needs, allies, and threats in common. Nonetheless, for more than 60 years, both nations have occasionally been exchanging aggressions, particularly over the contested maritime territory of Dokdo/Takeshima. These islands are important primarily for their fishing resources (although discoveries of natural gas are set to increase their value; Emmers, 2010, pp.

15-16), which, considering the productive capabilities of both nations, might hardly justify the costs of a conflict. Still, their value cannot be assessed solely from a materialist point of view: What is also at stake is the national pride (pp. 1-3).

Between the 1950s and 1990s, both Governments made regular efforts to downplay the conflict in favor of economic interests. Koo (2010) argues that, as economic development was the primary goal of South Korea during this period, its leadership preferred to suppress domestic grievances to maintain a positive economic relationship with Japan (pp. 71-72). However, as the South Korean economy grew, its economic interests subsided in favor of a foreign policy that became more nationalistic and assertive. The pattern of conflict suppression was fundamentally broken in 1997, as South Korea's first democratically elected civilian president in decades took decisive action in response to the seizing of Korean fishers near the contested islands. To this end, the shift from development-centered diplomacy towards declared animosity was made possible, at least in part, due to South Korea's significant degree of economic prosperity achieved, combined with trade dependency between both countries reaching an all-time low since the 1960s (pp. 67-68).

2.2 Technological development of China

The rise of China has attracted many researchers interested in studying China's technological and economic progress. In this section, the literature review will be analyzed through the lenses of two opposing broad IR Theories: i) Realism, which perceives China's technological development as guided by a techno-nationalist strategy of global hegemony; and ii) Liberalism, which interprets China's peaceful rise as part of a general trend of economic interdependence and techno-globalism.

2.2.1 Realism and techno-nationalism

In an environment of trade wars and intensifying rivalry between the US and China, the Western public opinion and academic production seem to broadly coalesce over a narrative akin to that of a new Cold War. In this perspective, China's technological development is often described as part of a broader domination strategy. Such position has been explored in great detail by Scobell et al.'s (2020) report on China's Grand Strategy: Trends, Trajectories, and Long-Term Competition. According

to this report, the core goals of China's latest grand strategy – referred to as national rejuvenation – is to create a well-governed, socially sustainable, economically developed, technically sophisticated, and militarily dominant China by 2050. To achieve its grand strategy's ultimate goals, China is undergoing sustained and ambitious efforts to rebalance its diplomacy and economy and to restructure its science and technology industry. Going forward, China aims to learn how to lead diplomatically, politically, and technologically rather than keeping up with the rest of the world in these fields.

In Scobell et al.'s (2020) view, China's grand strategy has evolved from an initial emphasis on economic reform and GDP growth; to a broader vision of boosting total national power through economic, diplomatic, military; to now become a fully realized strategy to achieve great power status. To Chinese elites, major power status entails controlling activities within China's territory, its borders, periphery, and a level of global power and influence that preserves and defends national sovereignty, security, and development. (Scobell et al., 2020). Moreover, to achieve these goals, the combination of modern and potentially disruptive technology with military concepts will be critical. China has a slew of industry and technology development plans, ranging from aerospace to power to biotechnology, identifying critical investment areas for the public and private sectors. On the other hand, the report also warns that China's ambitious STI policies face significant obstacles, as its political and organizational culture may hinder innovation due to its weak intellectual property security and lack of a genuine academic freedom atmosphere.

Complementary to this view, Bitzinger (2015) argues that China's arm-manufacturing is a prime example of China's techno-nationalism, echoing Samuel's technology acquisition model. According to Bitzinger, China has habitually preferred to purchase military equipment that could be reverse-engineered and produced domestically. For example, after the 1989 arms embargo, China imported considerable amounts of defense technology from Russia during the 1990s and early 2000s. Nevertheless, despite the benefits from international cooperation, foreign dependencies were always perceived to be tactical and short-term, while the ultimate goal was autarky in innovation (p. 465). In an emblematic case, China acquired a license to produce the

Su-27 fighter jet locally, only to copy it later and manufacture it as the J-11B (Fisher, 2001, as cited in Bitzinger, 2015, p. 465)

However, it should be acknowledged that there could be underlying biases and interests in the aforementioned studies. For example, Scobell's report on China's Grand Strategy is carried out as part of a series of studies on US-China long-term competition financed by the US Army's Deputy Chief of Staff. As stated in the text itself, the mission of the report is to benefit the US Army in comprehending how the US and Chinese militaries' capabilities might evolve over the next three decades. Perhaps for such reason, it can be argued that the report makes an over militaristic and ahistorical assessment of China's national interests, neglecting to explore the distinctive characteristics Chinese nationalism or to examine the relationship between technology and nationalism beyond the perceived interests of Chinese leadership. There is a noticeable absence of ideas such as imperialism and the "century of humiliation", which are central to understanding the Chinese mindset and attitude towards technology, modernity, and development.

Moreover, a core belief of many Realists IR theorists (and which permeates Scobell et al. study) is the assumption that rising powers are bound to compete and clash military with the established hegemonic power. This principle, which seems to explain nearly all military conflicts in Europe, might be less persuasive when applied to non-Western history. According to Wohlforth et al. (2007, pp. 171–173), the East Asian system, which paralleled Europe culturally and economically until the 18th century, displayed very different international security dynamics. Wohlforth et al. argue that a careful historical analysis reveals no evidence of external balancing or other coordinated efforts to constrain China as the hegemonic power in the region between 1000 and 1800 CE – neither when China was strong nor when it was weak. Rather than motivating conflicts with aspiring powers, China's unipolar hegemony vis-a-vis neighboring countries assured regional stability, which can be exemplified by the number of states remaining essentially the same over the centuries. When China was stable, other states refrained from attacking each other or China. At the same time, China never attempted to translate its dominance into a formal empire over the whole system, despite having the military capabilities to pursue such a goal if it so desired Wohlforth et al. (2007, p. 172).

Notwithstanding, Chinese techno-nationalism could also be found beyond the military context. In its 2013 paper on "China's Search for Renewable Energy", Andrew B. Kennedy argues that China has maintained a pragmatic techno-nationalist approach towards developing its renewable energy sector. The wave of liberalization policies adopted in the early 1990s followed a techno-globalist logic at first: The Government concentrated its efforts on basic research and higher education without engaging in market interventions to support national companies or to ensure that FDI resulted in technology transfer. However, by the late 1990s, the results delivered by that strategy were perceived as insufficient by senior government officials, encouraging Chinese leadership to adopt a more techno-nationalist approach in the early 2000s (p. 913).

In the National Medium and Long-Term Program for Science and Technology Development (2006–20) (MLP), China acknowledged the challenge of acquiring valuable technologies from other countries, vowing to enhance its indigenous innovation capability to be competitive in a fierce international environment (China, 2006, p. 7). To this end, while the document also highlighted international technology collaboration as essential to address existing gaps in China's national technological capabilities, cooperation should be done pragmatically, with autonomy as the final goal.

In their study of international collaboration in low-carbon innovation, David Tyfield and John Urry (2009) have also observed this nationalist tendency. Based on interviews with key stakeholders from that sector, the authors concluded that broader cosmopolitanism perception of science was still limited. Although many interviewees recognized the inherent transnationalism of climate science and the promotion of reason as a universal language, there was a consensus that the primary purpose of Chinese international collaboration should be to improve China's own national STI capabilities (pp. 802-804).

Nonetheless, other authors would further challenge the notion of China's current technological development as a nationalist quest for hegemony. The following section will examine the techno-globalist argument that China has not only benefited from international collaboration and globalization as a recipient, but also has actively encouraged interdependence and broader technological cooperation.

2.2.2 Liberalism and techno-globalism

At the dawn of the 21st century, China's admission to the World Trade Organization was perceived as a mark of success for the liberal order. Since 2001, China has committed to and benefited greatly from its involvement in the international trade system. According to Xiao (2013):

> "Within the multilateral trade regime, China has evolved from learning the rules of the game – familiarising itself with them – to applying the rules, and even participating in rulemaking: it is, in fact, becoming a mature member in the multilateral trade system. In East Asia, China has become deeply involved in the regional web of free trade arrangements. Trying to be prudent, it is careful not to seek a "maximisation of interest", but instead attempts to care about others' preferences and tries to share economic development and prosperity with other Asian countries." (p. 232)

This position aligns with more liberal IR schools of thought and reflects a more interdependent perception of China. According to this worldview, the emergence of new issues and threats demands greater cooperation from states and, consequently, rules that guarantee such agreements. As discussed in the previous section, Realists see the world as an anarchic system where force is the most effective way to secure national interest. However, in an interdependent world, issues such as the environment, migration, organized crime, terrorism, human rights, among others, cannot be answered by military force, demanding coordinated actions between states (Karns et al., 2015, pp. 44-53). IR Neoliberalist Theory agrees with the Realist premise that states are 'rational actors' attempting to maximize their power. However, neoliberals would argue that states' goal is to maximize their absolute power, not relative power. Therefore, the gains of the others can still be reconciled with their own gains. According to Nowotny (2012), common action among states is necessary to achieve a common good or avoid common evil; following a narrow idea of national interest only slows down such community goals (pp. 91-94).

This perspective also implies that, even if nationalism might play a role in domestic politics, it has little effect on China's current STI policy. Edgerton (2007) argued that the openness to foreign investments at the end of the 1970s was responsible

for massive industrialization in China; however, it did not translate into developing a robust local technological infrastructure. Edgerton explains that "The majority of China's exports, especially in the electronics sector, come from foreign-funded and foreign owned enterprises, rather than either state-owned or locally privately owned ones" (p. 31). And indeed, in a globalized world where robust supply chain networks connect production and consumption, the laws of supply-and-demand and comparative advantages seem to be much more helpful in generating wealth and prosperity than protectionism and nationalism.

In similar lines, Nakayama (2010) argues that the market-driven approach championed during Deng Xiaoping's era was an early example of techno-globalism, even though the term was not in use at the time. According to the author, China managed to carry out technology transfer without directed public interventions through many ways: Reverse engineering imported products, alliances and licensing between multinational companies, and the creation of skilled local workforce trained by subsidiaries of foreign companies installed in the country (pp. 13-14).

A similar perspective can be seen in a study by Lee (2009) on "China's ICT standards policy after the WTO accession", which compares the development of two national ICT standards in the early 2000s: A wireless security protocol called WAPI (Wireless LAN Authentication and Privacy Infrastructure), and China's standard for 3G mobile technology named TD-SCDMA (Time Division Synchronous Code Division Multiple Access). In this study, the author asserted that WAPI can be considered a case of techno-nationalism while TD-SCDMA of techno-globalism; this difference could indicate the failure of the former and success of the latter. WAPI was developed to become China's only standard for wireless security protocol, incompatible with other international Wi-Fi security protocols, and details of its encryption algorithm were provided only to a select number of Chinese firms. In the end, however, these limitations and the apparent violation of WTO's non-discrimination rules caused international manufacturers to reject the standard, which ultimately led to its abandonment by China.

TD-SCDMA was also developed as a Chinese alternative standard (for 3G mobile technology); however, competing international standards were also allowed to coexist in the country. Furthermore, rather than being a Chinese-only endeavor, TD-

SCDMA's creation emerged from a strategic alliance with Siemens and other international partners, and the International Telecommunication Union approved it as an international standard for 3G mobile communications. Lee's research seems to indicate that, while the techno-nationalist reasoning of WAPI's development led to its downfall, the TD-SCDMA standard prospered due to its techno-globalist strategy, which included collaboration with international actors without discriminating in favor of few national firms.

So, has nationalism become a hindrance to China's recent technological development? Far from a consensus, the reviewed academic literature has apparent contradictions and gaps that still need to be explored.

2.2.3 The paradoxes of Chinese technological development in the context of becoming an innovation-driven economy

The argument that China has benefited from globalization, FDI, and technology transfer from MNEs seems reasonably accepted. Nonetheless, as previously discussed in section 2.1.6, a strictly liberal strategy that focuses on the internationalization of the economy and FDI as a driver for technology development will, at the very best, promote a dependent type of development. While the merits of dependent or autonomous development are beyond the scope of this research, it is fundamental to acknowledge this distinction and understand how China perceives this issue.

Most literature reviewed tried to explain China's policymaking based on the 'rational actor' model, which assumes that a state pragmatically calculates how to maximize its relative or absolute power. However, such an assumption could also be a drawback for mainstream IR theories: They attempt to be universalist by design, yet they often explain the world through the lens of Western experiences and values. They suggest that policy calculations are primarily utilitarian, and states with similar capabilities, as rational actors, would act according to similar instincts and interests. History is not ignored by these theories; but it is treated as a natural laboratory of atomized case studies to validate their hypotheses. The prescriptions, nonetheless, are ahistorical.

On the other hand, it should be recognized that institutions such as laws,

national identity, and culture, also influence policymaking. The perception of national identity and interests can vary quite a lot in time and space, and knowledge and technology themselves have a role at influencing the thinking of a society, as claimed by the philosophy of technology (Kaplan, 2009). At an individual level, Chinese policymakers and business people are heavily influenced by their national identity. That is not to say that they necessarily pursue nationalist policies, but national identity and history should be a part of any substantive analysis exploring the influence of nationalism in China's technological development.

A final point to be made is that previous studies explored mostly China's catching-up experiences. However, technology acquisition and transfer are less evident in frontier technologies, since emerging innovations ought to be new to the world. Being at the forefront of many of these industries, China could pursue a techno-nationalist strategy to actively secure the autonomy and national ownership of these innovations. Alternatively, it could also gain from a techno-globalist strategy, letting its firms benefit from international cooperation and exploit its innovations in foreign markets.

With all this considered, it is reasonable to say that there is still a literature gap regarding how Chinese nationalism will affect China's policies towards becoming an innovation-driven economy. The next chapter will describe the methodology proposed to address the research problem of this work.

CHAPTER 3
RESEARCH METHODOLOGY

3.1 Theoretical background

A vital element of this research will be to identify the idea of nation and nationalism and how it affects policymakers and regular individuals. It is important to note that studying national identities and perceptions cannot be treated in a quantifiable and precise scientific framework – it is instead a matter of interpreting perceptions. In this regard, Constructivist IR theory seems to be the most suitable theoretical framework to analyze the subjectivity of agents, offering tools to understand the perception of national values and sense of belonging of a country's population.

3.1.1 Constructivism

The basic idea of constructivism is that decision-making agents are not purely rational but are instead influenced by the identities and perceptions acquired through social interactions. In constructivism, the beliefs and identities of the actors are defined by a socially constructed context, and actors and the structure are mutually constituents. The actors are not separated from their social environment or the systems of shared meanings, i.e., the culture (Herz & Hoffmann, 2004, p. 73). Perceptions of the self and others are at the same time determinants of and determined by behaviors, whether by domestic agents or states in the international system. For instance, the identities and interactions of European states in the 19th century were characterized by mutual mistrust and rivalry, which now are unthinkable as the perceptions are entirely different.

National identities play a role inside the state as well, and, in fact, intergovernmental cooperation has its limits if not followed by the positive support from its populations, particularly in democratic governments. One example is Wendt's view on international anarchy. The author agrees with the Realist assumption that states seek survival in a system characterized by the absence of supranational laws or powers, i.e., anarchy. However, the very understanding of anarchy has changed throughout history and is not uniform across all states. Three cultures of anarchy can be seen in the

international system. In the Hobbesian culture, states saw themselves as enemies, conflict was endemic, and survival was achieved only through self-help. Nonetheless, starting from the 17th century, a Lockean culture came to dominate. It was no longer a context of the constant war of all against all, and even if the states were still thinking about others as enemies, sovereign states had assured a mutually recognized right to exist. Finally, we have the Kantian culture emerged among the liberal democracies consolidated after World War II and emphasizes international cooperation and friendship, the peaceful resolution of controversies, and mutual support against external threats (Wendt, 1992).

Constructivism also highlights the role of social norms in international politics. March and Olsen explain this phenomenon as the “logic of appropriateness” as opposed to the "logic of consequences" (March & Olsen, 2011). The last one is the decision-making mechanism according to the traditional theories of International Relations, like realism and institutionalism, in which states act rationally to maximize their own interests. However, according to the "logic of appropriateness", rationality is grounded and balanced by what is socially accepted under current social norms, like the expected behavior of an exemplary state. Rules are followed because they are understood as something natural, fair, legitimate, and expected, and actors seek to comply with the obligations incorporated into their social role. Institutions have a crucial role in creating these norms and identities. Thus, while traditional economic theories can partially explain the political and economic rationale of the agents’ actions and their consequences, constructivism has the potential to explain the subjectivity that motivates the decision-making processes, which is essential to observe the presence of nationalism in agents.

Another relevant feature of constructivism is its greater emphasis on non-state actors. International forces can define identities and interests, that is, norms of behavior embodied in the international society. Moreover, one way to transmit the norms of the international society to states is through international organizations, which shape national policies by 'teaching' states what their interests should be (Fietta, 2010). Unlike Institutionalist theory, which sees international institutions as a complement to the interactions between states, in Constructivism, international organizations have a more individual character, occasionally acting according to their own agenda despite

the interests of some member-states. As Barnett and Finnemore point out, international organizations have the authority and legitimacy to carry out their functions in ways that states cannot, and often have the material capacity for it, with their own budgets or even shared military power (Barnett & Finnemore, 2004, pp. 3-10).

When looking at Chinese nationalism through the lenses of Constructivism, it appears that Chinese nationalism is indeed marked by historical awareness, both in terms of past leadership in the continent as well as of past failures. This might be translated to national STI policies that focus on self-reliance, reducing potential vulnerabilities, risk-aversion regarding cooperation with international partners, and a strong wish to (re)stablish continental leadership.

Constructivists disagree with the Realist idea of "rational actors"; they believe that identity is created by the interactions between actors and subjects in a learning fashion and by creating path dependency. Therefore, there is an emotional aspect to policymaking that comes from socialization, their national perception of themselves and the others. The conscience of colonization and imperialism is still powerful, in what China calls "the century of humiliation", and there is a case to be made that the technological superiority of imperialist countries was the demise of China in the 19th century. Therefore, it is expected that the Chinese policy towards becoming an innovation-driven economy is not simply a matter of economic growth, but a civilizational mission: China must have leadership and technological superiority in order to restore and secure its rightful place in the world. This could translate into policies that highlight science as a national value and strategies towards technological development that are Sinocentric, well-financed, and less open to cooperation.

3.2 Analytical framework

Rather than attempting to assess causal relations between variables and test hypotheses, Constructivism aims to explain the motivations underlying the actions of an international actor. Therefore, following the constructivist framework, this research will use an interpretivist, qualitative methodology, with the directed content analysis method proposed by Hsieh & Shannon (2005).

As previously stated, China has introduced a wide range of sector-specific and technology-specific policies; analyzing all of them would be impossible in the time frame of this project. However, China's 5-year plans can provide an overarching road map of the Chinese strategy towards technological development, from the catch-up phases of the early 2000s to the mastering of frontier technologies in multiple strategic sectors. The documents are also insightful windows to contemporary Chinese ideology and the perception of itself and its role in global affairs.

As briefly discussed, the conceptualization of modern Chinese nationalism has been in constant evolution: Emerging as a reactive response to imperialist threats and developing into a complex system of interconnected variables related to patriotism, socialism, modernization, and tradition. Therefore, prior to direct analysis of the policy document, an initial contextualization is required. This will be achieved through a literature review of the historical development of Chinese nationalism and its characteristics, as well as cases where Chinese nationalism and values have unambiguously defined a position taken by China. These studies provide a plethora of instances of Chinese nationalism in action, which will enable an inductive content analysis by highlighting explicit and implicit ideas and categories as well as looking for underlying themes, ideological framings, and other possible categories.

Once the specificities of Chinese nationalism have been understood, the policy documents can then be appropriately analyzed through a deductive category application based on the Constructivist theory, as it "can provide predictions about the variables of interest or about the relationships among variables, thus helping to determine the initial coding scheme or relationships between codes" (Hsieh & Shannon, 2005, p. 1281). Based on this methodology and the literature review presented in Chapter 2, the three categories below describe a meaningful coding scheme to be applied to the main national policies guiding China's development strategy, namely the China's Five-Year Plans for National Economic and Social Development:

- **Creation of innovation**: This category looks at the mechanism to promote STI[1] development from the supply side and the main actors

[1] The main type of innovation discussed in this research is advanced, technology-based innovation, which emerges from the application of new scientific and technological developments.

responsible for it. A techno-nationalist framing would be identified by an emphasis on independent development by national research institutions and national firms, indigenization of technologies from abroad, state activism, and overall national ownership of STI development. Techno-globalists would not be concerned about the nationality of STI, and as such, acquiring technologies from abroad through FDI or international cooperation is equally acceptable. Furthermore, techno-globalism does not perceive technology as a strategic commodity that requires safety, so technical assistance and STI outflows are also permissible.

- **Direction of innovation**: This category looks at the demand side of innovation and where the developments of STI are being directed. Techno-nationalism argues that technology has a strategic role in raising the national capabilities in the international arena. Therefore, innovation is directed towards strengthening national industries in multiple sectors (even if they are not as efficient as simply importing goods) such as national consumption, military, and dual-use applications, and overall scientific development applied to non-economic fields ("innovation for its own sale"). Techno-globalism also directs STI development towards improving productivity, but with a clear prioritization towards strengthening the country's comparative advantages (rather than artificially creating new capabilities) and fulfilling the demands of global markets. Techno-globalism has also been described as sensitive to using STI to address global climate change and international development issues.

- **Normative framework**: This category looks at the background conditions of the national innovation system that influence the creation and application of STI in the country, such as regulations, technical

Given this strong interconnection, the terms "innovation" and "STI" have been used interchangeably in this analysis for the sake of simplicity.

> standards, culture, and governance of STI. Techno-nationalism encourages national coordination of efforts based on cultural and patriotic interests; regulations to protect and nurture national technological capabilities, such as import restrictions; and explicit and implicit norms that make the entrance of foreign actors difficult. The normative framework of techno-globalism is pro-market and advocates for liberalization, equal treatment of foreign and national companies, cosmopolitanism, and respect for social and environmental causes based on international norms.

These categories are not mutually exclusive, as the development of science, technology, and innovation are not linear processes, but are immersed in and emerge from a dynamic and interactive system. Based on those three categories, this coding scheme will be applied with the assistance of qualitative data analysis software (Atlas.ti). It should adhere to these additional criteria: (i) Each individual unit of analysis is defined as a complete sentence or directly connected strings of sentences; (ii) each unit of analysis must contain an explicit reference to research, science, technology, innovation, or similar term; and (iii) multiple codes can be assigned to the same unit.

By applying this analytical framework, it will be possible to transform qualitative data into codable units and categories schemes. These codes will be used to analyze the relevant source materials deductively. This can be further developed into simpler numeric representations of data for frequency analysis and basic descriptive analysis. The main benefit brought by this technique is that it enables the concomitant analysis of each plan from both perspectives. Since these documents are comprehensive national development plans, they are bound to have characteristics of both ideological frameworks. By creating codable units of ideas, it is possible to overcome ambiguity by focusing on the frequency of specific codes to determine if techno-nationalist ideologies indeed influence said documents or if they are more neutral or techno-globalist in nature.

3.3 Potential limitations

The Government of China has not always published complete versions of the five-year plans nor has always made available official translations. The documents represent varying degrees of abridged versions of the complete text of the plan. Their lengths vary greatly: the document standing for the 10th Five-Year Plan has only 17 pages, while the next documents are 59, 55, 215 and 146 pages long, respectively. This has important implications to the analysis: the shorter the version, the more homogeneous and less diverse it will be, excluding topics, passages, or details considered less critical. Such filtering might turn more marginal trends invisible and restrict the granularity of the analysis, skewing the results in favor of the stronger lines of the plans.

The impact of translation should also be noted, whose quality varies greatly. Some of the documents used were collected from many sources and are direct translations from the Mandarin originals. The Chinese government produced an official English translation of 13th Plan, and the American think tank Center for Security and Emerging Technology translated the 14th Plan - both are high-quality renditions. The translations found for the previous plans were less sophisticated.

CHAPTER 4
RESULTS AND DISCUSSION

4.1 Building a national identity

A key variable to be analyzed is the perception of national identity: The meaning of Chinese nationalism, the overall perception of what is considered Chineseness, the features that include an individual as part of the nation, what defines the others, and the perceived position of China in the world. As observed in the literature review, nation-building is a process unique to each country; therefore, nationalism will be manifested in specific formats and with unique goals. It is also likely that the path chosen by China will be a reflection of what the country perceives as appropriate, based on its own values accumulated from historical interactions and artificially designed by social engineering. An emphasis shall be given to those characteristics associated with STI, such as the position of scientists in society, openness to emerging technologies, and the importance of self-reliance/cooperation in the progress of the nation. This variable can be analyzed by literature review on anthropological, historical, and sociological works that will paint a picture of the nation; discourse analysis of leaders, diplomats, and scientists in the media and official documents; and online surveys aimed towards university students, which will give an idea of the perceptions from the intellectual strata of society.

4.1.1 Early Chinese nationalism

As discussed previously, until the expansion of Western imperialism in the region, East-Asia was a somewhat stable unipolar system with China at its center. Contrary to the Realist idea of balance of power, no state had demonstrated intention to develop a technologically advanced military force to compete with and overthrow the established hegemonic power. Quite the opposite; states in the system had considerable levels of interdependence with China, with commercial, cultural, and scientific exchanges leaving lasting effects to this day. According to Kang (2007, pp. 30–46), trade, both private and tributary, made up a significant portion of government revenues and the region's national economies. Furthermore, many countries, such as Vietnam

and Korea, voluntarily adopted the Chinese education system, prioritizing the study of Chinese texts and incorporating Chinese inventions and technology into their economies and military. In such context, however, even if there is an identifiable Chineseness associated with many of these innovations, one would struggle to argue that Chinese nationalism played a significant role then.

The first use of the Chinese term for nationalism (minzu zhuyi) can be traced back to Liang Qichao, a reformist from the last years of the Qing Dynasty, who imported this term from Japan in articles he had written in 1899 and 1901 (Youwei, 1897, as cited in Hughes, 2006, p. 5). Qichao was one among many who observed that the transformations in the 19th century brought revolutions of a magnitude not seen in the preceding 4000 years, and China had to learn how to reconcile Chinese orthodoxy while importing knowledge from abroad. This strategy was quite new to China, as it had been an exporter of ideas and culture during most of its history. Nevertheless, the "Century of Humiliation", as it is called the period between the First Opium War (1839-1842) and The Second Sino-Japanese War (1937–1945), forced Chinese elites and intellectuals to develop different approaches to survive in a new international system, one in which China was no longer the center.

According to Meissner (2003), while Imperial China already had the elements to form a national identity under Western terms - a long history, a unified and highly developed culture, and a common language - the idea of nation was incompatible with the confucianist concept of tianxia, the world under heaven. This world view understood society as hierarchical, with authority derived from cultural superiority. Therefore, Chineseness came from language, culture and birth, and not all were equal under these terms. The ideas of nation and nationalist as perceived today would come by the end of the 19th century, as a force opposing Western imperialism and economic oppression. It was based on previous racial movements of union of the "yellow race" against foreigners, first to remove Manchus from power in the 17th century, then expanded to western invaders. Revolutionary Sun Yat-sen also added many elements to what he regarded as the fundamentals of the Chinese nation, mainly blood relations, language, religion and ethnic and cultural superiority (Meissner, 2003).

4.1.2 Revolution and Maoist China

The People's Republic of China (PRC) too has tried to reconcile Chinese identity with modernity. Maoist China tried to downplay the cultural heritage aspect in favor of modernity by socialist internationalism, advocating learning from socialist cultures and the Enlightenment, while at the same time being critical and careful only to absorb what was deemed useful (Hughes, 2006, p. 6). Chinese national identity during this period was molded by the confrontation between communism and capitalism exacerbated during the Cold War, as well as anti-imperialist sentiments promoted by the discourse of the Chinese Communist Party (CCP) as the force responsible to liberate China from Imperial occupation. As Yu (2012) explains:

> "The CCP government led a form of nationalism fueled by this strong sense of anti-imperialist nationalism. Anti-imperialist nationalism asserted that China's decline in the second half of the nineteenth century was primarily due to foreign imperialist aggression." (p. 75)

Japan is arguably the most important external agent in forming Chinese national identity, as it is the first imagined delimitation between "us-Chinese" and the "others". Japan has been used as the common enemy that unites all Chinese in resistance, at first as an occupying force during Japanese Imperial expansion, and recently as a perceived threat and unapologetic oppressor. Whether this narrative is factual is irrelevant, as nationalism is a powerful and emotional discourse, and the recurring clashes between both nations point to motives beyond reason and pragmatic statism. And indeed, up to this day, Japan remains as a prime example of the CCP's efforts to balance the needs of popular nationalism and pragmatic developmentalism (also similar to the relation between Japan and Korea described in section 2.1.6).

While the relationship between Imperial China and Japan had been mostly peaceful throughout history, with many commercial and cultural ties being developed over the course of millennia, the same cannot be said about the PRC and Japan. According to Gries (1999), the birth of the CCP can be traced back to the War of Resistance Against Japan (Kangri zhanzheng), as a moment in which the Chinese became aware of their national identity as opposition to Japan. Since then, Japan has served as the "other", the enemy who is in opposition to "us". In fact, he continues,

"whether in learning from the west in late Qing and Republican China, or in revolting against the west in the 1990s, Chinese have a long tradition of knowing the west and themselves through Japan" (p. 114). But that is not to say that Japan is simply perceived as an enemy; identity formation in both countries has been intertwined over centuries of interactions. Li Zhengtang describes the Chinese perception of Japan as a teacher-student relationship, with China being a benevolent teacher over centuries, yet in late 19th century China lost its student and was looked down by him; it would be then time for the student to be put back in his proper place (as cited in Gries, 1999, p. 133).

In the first decades of the PRC, nationalist discourse did not emphasize the Japanese invasion. While Japan continued to be fundamental for the Chinese identity during the period, the discourse of the CCP and Mao was "China as victor", highlighting the importance of the Communist Party on leading Chinese independence while criticizing its current enemies: the Nationalist Party, the US and later Soviet imperialism; few studies were made regarding Japanese invasion and putting China as a victim (Gries, 2000, p. 134). This kind of view enabled the period of amity between China and Japan that succeeded the normalization in 1972. Zhang (2014) describes two reasons for the rapprochement of Tokyo and Beijing: a favorable public opinion in Japan as well as Japanese official development aid (p. 9).

With the 1969' Nixon doctrine towards China, many countries, including Japan, shifted their foreign policy from Taipei to Beijing, a move particularly supported by the Japanese business community motivated by the economic opportunities offered by the Chinese market. Additionally, the 1973 Oil Crisis forced Japan to dissociate from the US and Israel in order to have better relations with Arab nations and secure its oil supply. This led to a Japanese foreign policy that was less subordinate to the US and more open to improving relations with China.

4.1.3 Post-Mao reforms

During the post-Mao reform and opening, tradition and nationalism were bound again as forces to legitimize the CCP rule, associating patriotism with love to socialist New China under the leadership of the Chinese Communist Party (Meissner, 1999, p. 209). In many ways, Deng Xiaoping's reforms were incompatible with the strong Marxist ideology that was intertwined with Chinese identity under Mao.

Therefore, in order for the reforms to be accepted, the CCP had to "redefine and re-adjust Communist ideology by supplementing it with more nationalist characteristics so that it could be a more persuasive and more effective means of defending the legitimacy of the government" (He & Guo, 2000, p. 9). Deng Xiaoping's discourses put great emphasis on connecting patriotism and economic development, stating that economic results are possible only through the union of all people. The reforms also changed how nationalism influenced Chinese foreign policy. As the discourse shifted from traditional Marxist principles and anti-imperialism to national interest and modernization, China could no longer isolate itself. This foreign policy was more pragmatic than ideological; it still maintained the discourse of "foreign economic exploitation and cultural infiltration as a source of China's weakness, but [believed] that the lack of modernization [was] the reason why China became an easy target for Western imperialism" (Zhao, 2000, p. 9).

Chinese nationalism under Deng can be understood as the promotion of a 'socialist spiritual civilization', a concept created in 1979 by Marshall Ye Jianying, and later crystallized in the 1982 revised Constitution (Hughes, 2006, pp. 22-24). The concept is described as:

> "Civic virtues of love of the motherland, of the people, of labor, of science and of socialism. It conducts education among the people in patriotism and collectivism, in internationalism and communism and in dialectical and historical materialism, to combat capitalist, feudal and other decadent ideas." (China, 1982, Article 24)

Peng Zhen, then Chairman of the Standing Committee of the Sixth National People's Congress, stated that to build a socialist spiritual civilization, the state has to expand education for the sake of modernizing science and technology and achieving the four modernizations, while also imbuing more citizens with a new sense of morality, integrity, and discipline as to acquire a revolutionary and vigorous mental outlook (Hughes, 2006, p. 23). In sum, to legitimize the reforms and economic opening, the CCP shifted the national identity from Maoist-Marxist ideologies to a discourse of nationalism justified by "promoting the reforms as necessary for China to reclaim greatness and avoid falling victim to other powers" (Pilger, 2011, p. 32).

The shift to a more open and friendlier foreign policy helped the Chinese economy capitalize on foreign capital and knowledge. For instance, the split between the CCP and the Soviet Union made China turn towards Japan as a trade partner and source for investment and technology. The Japanese government has played this role since 1979, providing official development aid used to build transportation infrastructure and projects in the area of medicine and the environment. According to the Ministry of Foreign Affairs of Japan (2016), "from that time to the present [as of 2016], approximately 3.3164 trillion yen in loan aid (yen loans), 157.2 billion yen in grant aid, and 181.7 billion yen in technical cooperation have been implemented" (para. 1).

However, with the relative liberalization, education, and economic growth that the urban population has started to enjoy in the 1980s, a popular form of nationalism also emerged as a force that could threaten the CCP if not well managed. The roots of a relative popular voice can be traced back to the Democracy Wall movement in Beijing and other big cities, appearing in 1978 and supported by Deng Xiaoping, who believed at the time that most of the open criticism was directed primarily towards his political opponents, being then a tool to legitimize party leaders and his reforms. While the movement would be short-lived, it can be seen as a significant development in a Chinese public opinion voice.

Furthermore, the late 1980's allowed many intellectuals and educated youths to have contact with Western ideas, culture and lifestyle, while at the same time triggering a wave of nationalism as a backlash to this new trend. Intellectuals such as Wang Xiaodong and He Xin believed that this newfound cultural cosmopolitanism allowed by the CCP was the "decline of ideology, national spirit, values, state consciousness, and social order" (Yu, 2012, p. 83), and that the events of Tiananmen Square were a result of it and a reminder that the Western model was not a solution to China's problems. Since then, Chinese nationalism has been molded by two sources: state-led nationalism and grassroots nationalism. The Tiananmen crackdown revealed that the state had to maintain a nationalist position, promoting a patriotic education and anti-West discourse. At the same time, it must be understood that the Chinese government does not have absolute control over popular nationalism. Notably, the new generation born in the 1980s was more aware of their own place in the country and the

world and of their ability to challenge the party with nationalist demands (Pilger, 2011, p. 17). Popular nationalism is non-structured, passive, reactive, and based on collectivism and the perception of a shared glorious past. The Chinese government is aware that it cannot neglect popular opinion, having to influence and adapt to popular demands as nationalism can be a force for legitimacy and delegitimization (Yu, 2012, p. 89).

One of the most emblematic cases of strategic balancing between economic interest and nationalist forces within China in this period has been the ambiguous relationship with its neighbor Japan. The following subsection will explore how the transformations in China caused a shift in the relationship between both countries and adjustments to China's very own identity.

4.1.3.1 Anti-Japanese nationalism and the "century of humiliation"

After the post-war normalization, the first significant clash between China and Japan was the "textbook dispute" of 1982. In what had been interpreted as historical revisionism, Japanese educational guidelines proposed adjustments to its history textbook that softened the language used to describe war-time events, such as changing the word "aggression" to "advance into" China and neighboring countries. This led to a massive diplomatic argument with neighboring countries, reminding them that historical issues were still a continuous source of attrition in the region. In response, the Chinese Government promoted a nationwide nationalist propaganda campaign to create "historical awareness" about the occupation period, to highlight the legitimacy of the anti-Japanese war and promote patriotism, particularly by educating youth to remember the past (Gries, 1999, pp. 135-138). While the Japanese government would eventually reconsider its position and diplomatic efforts of both parts would claim the issue as settled by the September of that year, the nationalist fervor in both countries had been awakened, and would resurge again as a massive popular protest in China in 1985.

During events remembering the 40th anniversary of the end of World War II in the Pacific, Japanese Prime Minister Nakasone Yasuhiro made his first official visit to the Yasukuni Shrine. This controversial shrine honors those who had died in the service of the Japanese nation, but is also perceived by neighboring countries as a place that honors war criminals who served Japanese imperialism. While downplayed by the

Chinese leadership in the efforts of maintaining cordial relations between both countries, this event was brought back one month later at the start of significant protests in September 1985. Chinese students placed posters in Peking University remembering the anniversary of 1931's Japanese invasion of Northeast China. When officials removed them, the student movement claimed such actions as unpatriotic and called for a demonstration in Tiananmen Square. This action was perceived as a movement from widespread hatred from Japan, while the Chinese Government reacted "ambivalently but prudently, mixing minimum force with maximum persuasion" (Reilly, 2014, p 202). Rising party leaderships such as Li Peng tried to negotiate with the students referring to China's foreign policy towards Japan as beneficial for Chinese independence and economic development; yet, public opinion still demanded a more assertive position, forcing a shift to a more critical foreign policy.

Gries (1999) also point out that during this period, the narrative of "China as victor" was being challenged by a new historical interpretation that focused on Chinese victimhood, particularly on the revival of interest in the December 1937 Nanjing Massacre (p. 145). As the author points out, the victimhood discourse had an instrumental use: To inspire development and modernization based on the premise that "weakness enabled abuse". This discourse was championed by forces within the Government and by popular support, particularly by the nationalist 80's generation, who themselves were not victimized but still glorified the struggles of those who came before. The first objective of this discourse is to quantify pain. Some scholars point to an obsession of nationalists to count everything they have and everything they have lost as a way to generate psychological strength for the imagined community to which they belong (Kaviraj, 2014, p. 44). This is manifested in passionate projects of counting material damages and victims during the Japanese occupation. The second focus intertwines with quantification, which is to make the Chinese case to the world. During the period, Chinese media readily recollected war crimes and kept pointing out the possible risks of remilitarization of Japan. Furthermore, the 1989 Tiananmen Square crisis put the Chinese leadership in a clash with the Chinese people, threatening the very legitimacy of the CCP to rule. In order to regain popular support, state-led nationalism was adjusted to further unite the Chinese people under a common enemy, Japan. The Patriotic Education Campaign and the anti-Japanese portraits in the media

during the 1990s promoted a villainization of Japan to highlight the accomplishments of the communist party while also diluting its errors (Zhang, 2014, pp. 18-19).

The culmination of the anti-Japanese sentiment, arguably still dominant in China today, manifested itself over the contested territory of Diaoyu/Senkaku Islands. These islets and rocks are claimed by China, Japan and Taiwan, and have been under Japanese administration since 1972. For over two decades, the Chinese Government had maintained its claim of sovereignty but without taking any direct action to challenge Japanese control, favoring a positive economic relation instead. However, the issue escalated in 1996 when a group of Japanese nationalists visited the island to restore a lighthouse built in 1978, which triggered massive protests in Mainland China, Hong Kong, and Taiwan. The clash was further accentuated by the death of a Hong Kong activist who tried to swim to the island, and the comments of Japanese Foreign Minister Yukihiko Ikeda asserting the sovereign right of Japan over the territory (Reilly, 2014, p. 204).

While reaffirming their own claim, Chinese officials were quick to suppress anti-Japanese demonstrations in Mainland China. Nonetheless, the widespread unrest and anti-Japanese discourse continued over the Internet and printed media, revealing "the existence of a dynamic discourse that challenged the Communist Party's hegemony over nationalism" (Gries, 1999, p. 170). The Chinese government took actions to suppress popular nationalism by banning books and censoring internet access. At the same time, the Chinese Government attempted to co-opt the narrative to appease popular anti-Japanese sentiments under its own terms, placing itself as the champion responsible for asserting sovereignty over the islands.

Confrontations continued over the following years promoted by a group called "baodiao movement", which aimed to promote initiatives such as to lease the islands for tourism, issue stamps celebrating the island, and organize voyages to the territories; all proposals rejected by the government. Nonetheless, a successful secret expedition landed on the islands in 2004, causing the Japanese government to arrest seven activists and ensuing a new wave of protests. While the government was again quick to suppress coverage of the incident by national media, it allowed protesters to burn Japanese flags in front of Japan's embassy to pressure the release of the activists, showing the risk of rapid escalation of animosity. Nevertheless, while the Chinese

Government still tried to downplay the event by preventing the released activists from speaking with the media, it was clear that Beijing was being forced to take stronger positions towards the territories with the risk of being swallowed by public dissatisfaction (Reilly, 2014, pp. 206-207).

When Tokyo Governor Ishihara Shintaro declared its wishes for his city to purchase the three islets from their private owner in 2012, the third wave of protests in China was even more destructive. Vessels from Japan, Taiwan, Hong Kong and Mainland China traveled to the territories in the succeeding two months, resulting in diplomatic fights and the recall of the Japanese ambassador from Beijing. Protests eventually spiraled out of control and many challenged the official stand as unpatriotic, directly challenging the party's leadership (Reilly, 2014, p. 209). Individual consumers also engaged in an embargo of Japanese products, an initiative carried independently by Chinese citizens but later received support from the Government, which added its own economic weight in displaying the country's growing economic power (Ryall & Moore, 2012).

Since then, while widespread protests eventually subdued, China has maintained a more assertive position regarding the territories, sending occasional naval vessels, including a military ship for the first time in 2016, and also establishing air control above the region. Efforts are still being made to improve diplomatic relations between parts, but the issue cannot be ignored like it was in the past. The position of Chinese president Xi Jinping has been made clear: "I will absolutely not relinquish our nation's valid interests" (Mainichi Japan, 2017).

4.2 Comparative analysis of Tenth to Fourteenth Five-Year Plans for National Economic and Social Development (2001-2026)

4.2.1 Tenth Five-Year Plan (2001-2005)

The Report on the Outline of the Tenth Five-Year Plan for National Economic and Social Development (China, 2001) demonstrates that the plan was developed to steer the Chinese economy towards taking full advantage of globalization and information technologies. As indicated in Table 4.1, the plan adopts a particularly techno-globalist normative framework: It sets a challenging yet optimistic outlook of

the international context and encourages broader integration of China with the global markets. Most notably, the plan covers China's commitments towards the WTO, which includes market reforms, de-regulations, and the adoption of international standards.

Table **Error! No text of specified style in document.**.1

Code frequency of approaches in the Tenth Five-Year Plan (2001-2005)

Category	Approach	Codes	Predominant approach
Creation	Techno-Globalism	5	42%
	Techno-Nationalism	7	58%
Direction	Techno-Globalism	11	52%
	Techno-Nationalism	10	48%
Normative Framework	Techno-Globalism	12	67%
	Techno-Nationalism	6	33%

Hu (2013) noted that the 10th plan still follows a similar pattern from previous plans by maintaining a predominantly economic focus. However, it also introduces more non-economic considerations to the agenda, such as sustainable and inclusive development; a trend that would be fully realized in the 11th plan.

Creation of innovation

The creation of innovation is explicitly linked to the opening of China to the outside world. It acknowledges that more reforms are needed to break down the institutional obstacles to developing productive forces in the country.

While the plan indicates that the country must develop its capability to innovate, innovation on itself is not a central part of the plan, which focuses on industrialization and catching up by promoting inflows of capital and knowledge. On the other hand, the plan also discusses, for instance, the importance of attracting foreign talents and fostering returnees to develop their research in China. This seems to corroborate the idea of a pragmatic techno-nationalism, which acknowledges the importance of international collaboration, but that it should be built in the national territory.

Direction of innovation

The use of STI discussed in this plan seems to be primarily considered an economic factor, without much attention to more political and strategic uses. The plan highlights the importance of innovation to be applied to improve national productivity, but still in the context of an export-oriented economy.

It highlights the importance of enhancing traditional industries with high, new, and advanced technologies, but also in the context of market-driven reforms. The plan highlights the need to increase product variety, improve quality, save on energy, reduce waste, prevent and control pollution, and increase productivity. To achieve this, general measures are proposed the energy, metallurgy, chemical, machinery, automobile, building materials, construction, textile, and light industries.

Information technology products are the most noticeable sector that has been marked as necessary to be developed independently. The plan indicates the need to develop the national capability to manufacture all components of integrated systems to enhance China's capability for independent development. It also strives to make breakthroughs in vital technological fields that directly impact economic lifelines and national security.

Normative framework

The self-declared guiding principles of the plan are: i) Making Development the Central Theme; ii) concentrating on economic restructuring; iii) making reform, opening and technological progress the driving force; iv) making improvement of the people's living standards the basic starting point; and v) coordinating economic development with social development.

The plan seems to reflect the liberal aspirations accompanying China's joining of the WTO. It emphasizes market reforms to create a more competitive environment, claiming that China has reached the point where it cannot develop its economy further without making structural adjustments. It then proposes accelerating the establishment of a modern corporate structure, encouraging large and medium-sized state-owned enterprises to adopt the share-holding system and change their operating procedures by listing their shares on the stock market, setting up joint ventures with

foreign investors, or holding each other's shares. It also calls for deepening the reform of state-owned enterprises to compete as equals in the market economy.

The plan also comments on the inclusive participation on the policy priority-setting, encouraging more participation by all elements of society, thus making it a process of giving full scope to democracy, absorbing all valuable ideas, and reaching agreement among all sides.

4.2.2 Eleventh Five-Year Plan (2006-2010)

The Guidelines of the Eleventh Five-Year Plan for National Economic and Social Development (China, 2006) represent a pivotal point for the STI development of China. In many ways, the document seems to indicate a faded optimism for globalization, highlighting the growing economic inequality and uneven power dynamics in technological development between developed and developing nations instead. It also identifies an intensifying global competition for resources, markets, techniques, and talents, foreshadowing new manifestations of trade protectionism. This seems to be well reflected in Table 4.2, which indicates a predominance of techno-nationalist characteristics in all categories.

Table **Error! No text of specified style in document.**.2

Code frequency of approaches in the Eleventh Five-Years Plan (2006-2010)

Category	Approach	Codes	Predominance of approach
Creation	Techno-Globalism	11	31%
	Techno-Nationalism	24	69%
Direction	Techno-Globalism	9	32%
	Techno-Nationalism	19	68%
Normative Framework	Techno-Globalism	8	36%
	Techno-Nationalism	14	64%

Creation of innovation

Unlike its predecessor, the 11th plan emphasizes the need for independent creation of innovation in nearly all fields. While the theme of the previous plan was

reform and opening to improve domestic industrial productivity and access to international markets, the 11th plan seeks to promote national economic growth driven by scientific and technological capabilities. It proposes to guide public capital towards essential industries to the national safety and national economic arteries, optimize state-owned economic distribution, and reinforce the controlling, influencing, and driving forces of the state-owned economy.

FDI is still significant, but the plan explicitly aims to guide foreign capitals to invest in high-tech industries, focusing on the modernization of old industrial zones and software development. It also encourages transnational companies to extend their industrial chain in China and carry out technological innovation activities in Chinese territory by establishing regional headquarters, R&D centers, procurement centers, and training centers in China. While techno-globalist by definition, this strategy seems to be contextualized as a means to establish China as an STI power-house in the region; therefore, it assigns importance to the territoriality of innovation.

The plan also encourages the formation of a group of enterprises with a strong competitive force that can cooperate in research, development, design and manufacturing activities. It also set instruments to guide domestic enterprises to conduct multi-form cooperation with transnational companies better and harness the technology spill-over effect from foreign capitals.

Direction of innovation

STI capabilities are guided towards the needs of many vital sectors, national defense, and geopolitical interests. The 11th plan highlights the importance of military modernization and describes the intention of building a strong army through science and technology, pushing forward the combined development of mechanization and informatization. In similar lines to the dual-use technology strategy that Samuels described in Japan (see import-substituting indigenization in section 2.1.3), the plan explicitly advocates for the combination of military efforts with civilian support, strengthening the basis and independent innovation, and upgrading the science and technology capabilities of the national defense industry for both military and civilian purposes.

The role of independent STI development is also made much more explicit in this plan, indicating a growing concern with reducing technological dependence. Rather than just focusing on creating an enabling environment for FDI, the plan proposes that national R&D efforts be directed towards the independent production of advanced capital goods and equipment which can reduce China's dependence on advanced industrial capital goods.

Independent innovation ability is also directed towards forming well-known Chinese brands with proprietary intellectual rights and a relatively strong international competitive force. This indicates China's intention to fulfill external demands not only by manufacturing for MNEs, but also directly through Chinese enterprises.

Normative framework

The plan asserts the need to construct scientific and technological support systems and comprehensively promote scientific and technological independent innovation ability, not only as an economic strategy but also part of their nation-building process of "rejuvenating the country":

> "We shall deeply implement the strategy of rejuvenating the country through science and education and the strategy of reinvigorating China through human resource development, take the enhancement of independent innovation ability as the strategic base point for scientific and technological development and the key link for change of growth mode and greatly increase the original innovation ability, integrated innovation ability and introduce and absorb re-innovation ability." (p. 3).

Techno-nationalism gets embedded in the NSI of the country through two main avenues: The cultural industry and basic education. The plan advances significantly in establishing links between culture, national values, and STI development. It makes explicit efforts to form a group of cultural institutions and enterprises with a socialist cultural orientation, relatively strong independent innovation capabilities, and competitive market power. The plan also advocates for the training of high-quality talents with the ability and moral integrity to construct an innovative

country. This normative aspect is further highlighted by proposing the combination of natural science with philosophy and social science.

Furthermore, the normative reasoning behind the proposed regulatory adjustments is much more ambiguous than in the previous plan. On the one hand, the liberalization of the economy seems to be intensified. The plan repeatedly calls for strengthening citizens' intellectual property rights awareness, improving the intellectual property rights protection system, establishing intellectual property right pre-warning mechanism, and severely cracking down on infringements of intellectual property rights. It also imposes that governments at various levels shall sustain fair competition, strictly prohibiting direct intervention in the enterprise's operation activities or the regular operation of market mechanisms. On the other hand, the regulations are also contextualized as mechanisms to protect national firms. For instance, the plan proposes to guide foreign merchants to participate in the restructuring and innovation of domestic enterprises based on protecting the domestic independent brands. It also stresses the need to improve national standards and eliminate backward standards. However, standards are not neutral in the plan, as preference is given to adopting technical standards with independent intellectual property rights and active participation of China in the formulation of international standards. This ambiguity is well reflected by Lee's (2009) research about the development of ICT standards during this period.

The plan also proposes increasing Chinese aid to other developing countries and further strengthening economic and technological cooperation with them, thus leveraging cooperation in STI towards the advancement of Chinese diplomacy.

4.2.3 Twelfth Five-Years Plan (2011-2015)

The 12th plan (China, 2011) deepens China's transition towards identifying itself as an innovation-centric country. It persists in taking an industrialization path with Chinese characteristics: Adapted to market demands, leverages the relative advantages of the country's industrial sector in the global economy, and is aligned with new trends in sci-tech progress. Furthermore, the plan aims to develop a modern industrial system that is structurally optimized, based on advanced technologies that are clean and safe, with high value-added, and that has a strong capability to create employment.

As observed in Table 4.3, the strategy towards technological creation and direction blends elements of techno-nationalism and techno-globalism. However, its greater emphasis on a techno-globalist normative framework seems to indicate a rupture from Yamada's characterization of neo-techno-nationalism, as cooperation with other developing countries and technical assistance goes beyond a pragmatic strategy to create national capabilities in China; however, it aligns with China's more traditional socialist values as discussed in section 4.1.2.

Table **Error! No text of specified style in document.**.3

Code frequency of approaches in the Twelfth Five-Years Plan (2011-2015)

Category	Approach	Codes	Predominance of approach
Creation	Techno-Globalism	4	44%
	Techno-Nationalism	5	56%
Direction	Techno-Globalism	10	56%
	Techno-Nationalism	8	44%
Normative Framework	Techno-Globalism	11	85%
	Techno-Nationalism	2	15%

Creation of innovation

The 12th plan still advocates enhancing the capabilities of independent innovation and absorbing and re-innovating imported technologies. The plan describes indigenous innovation as a principle of Chinese economic development, indicating the increasing centrality of innovation for the economy.

At the same time, there is less of an explicit techno-nationalist tone to the creation of innovation compared to the previous plan. International cooperation is incorporated further, as the plan indicates China's intention to support technical research, development, and investment cooperation overseas; and increase economic and technical assistance to developing countries in livelihood and welfare projects and building independent development capabilities. It also acknowledges the need to introduce high-level talents and advanced technologies from overseas, encourage foreign-funded enterprises to set up R&D centers in China, borrow international

advanced management concepts, systems, experiences, and actively merge into the global innovation system.

Direction of innovation

Another evolution from the previous plan is that innovation is directed beyond just boosting competitiveness but towards placing China in a leading position for scientific advancements in materials science, life science, space science, earth science, and nanotechnology.

Furthermore, there is a much stronger push to apply innovation towards environmental objectives, directing STI capabilities towards environmental protection, strengthening national capabilities on environmental monitoring, early-warning, circular economy, re-manufacturing and emergency-handling capability building. It also calls for pragmatic cooperation in scientific research, technological development, and capability building for climate action, including setting up funds, technology transfer, and technical assistance to developing countries.

STI is also more explicitly directed towards military and dual-use applications, which can provide services in peacetime, respond to emergencies, and combat during wartime. The 12th plan is more comprehensive than its predecessor in describing the importance of building advanced STI capabilities for the defense industry. In this plan, science and technology become central to make the army strong, connecting the ability to accomplish diverse military tasks and win regional wars with information-based capabilities. It further highlights the role of informatization, advanced R&D, and manufacturing to overcome basic constraints on scientific research and production and promote the indigenous development of weapons and equipment.

Finally, innovation is also directed towards boosting China's position in international affairs. Through its "go global" strategy, national innovation capabilities are directed towards expanding its large transnational companies and enhancing internationalized operations. Technological cooperation is also used as an instrument of foreign policy, especially regarding Taiwan (China, 2011, p. 51).

Normative framework

The normative framework of the 12th plan expands the principle of market orientation, enterprises' independent decision-making, and the separation between

government and non-government functions. At the same time, it also highlights the role of the government to guide the convergence of factors of production and build several international competitive, advanced manufacturing bases through major national projects.

The 12th plan is more explicitly aligned with environmental and inclusive development goals than its predecessor. As discussed, environmental issues receive much more attention in this plan: The plan set ambitious standards for laws, regulations and standardization systems for environmental protection, intensifying the enforcement of environmental protection laws with a social supervision mechanism and a system to identify and prosecute actors responsible for environmental and pollution incidents.

Inclusivity is also considered, as the plan asserts the need to raise the quality of compulsory education and the balanced educational development level in rural areas. However, equating this progressiveness to developed capitalist nations' liberal and cosmopolitan values might be erroneous. While the outcomes might appear the same, the value system behind such policies are uniquely Chinese:

> "We should hold high the great socialist banner with Chinese characteristics, guided by the important thinking of Deng Xiaoping Theory and the "Three Represents," implement the scientific development concept in depth; adapt to new changes in situation in abroad and at home; meet with the new expectations of the people of various nationalities for leading even better lives; make the scientific development as the main theme and the transformation of the economic development model as the main line to deepen reform and opening up; protect and improve the people's livelihood" (China, 2011, p. 5)

This difference is crucial and not fully described in the literature reviewed in section 2.2: The outward orientation of China's STI endeavors is neither completely techno-nationalist, because it explicitly declares a cosmopolitan and universal motivation; nor it is fully techno-globalist, as it emerges from a defined socialist framework which is intertwined with national values and identity.

4.2.4 Thirteenth Five-Years Plan (2016-2020)

The 13th plan defines the complete transition of China towards identifying itself as an innovation-driven economy. While previous plans signaled the importance of creating indigenous STI capabilities to boost industrial productivity, the 13th plan goes a step further, assigning value to innovation as an end in itself, with a greater focus on the service industry and national consumption. It has multiple examples of techno-nationalist and techno-globalist strategies, as indicated in Table 4.4.

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Code frequency of approaches in the Thirteenth Five-Years Plan (2016-2020)

Category	Approach	Codes	Predominance of approach
Creation	Techno-Globalism	30	56%
	Techno-Nationalism	24	44%
Direction	Techno-Globalism	13	42%
	Techno-Nationalism	18	58%
Normative Framework	Techno-Globalism	25	63%
	Techno-Nationalism	15	38%

Creation of innovation

This plan indicates a techno-globalist shift in the creation of innovation. The Government aims to develop private-sector entrepreneurship at all levels while redirecting public efforts away from R&D management and towards providing innovation services – facilitating, financing, and de-risking the entire scientific and technological innovation process. There is a solid impetus to integrate scientific and technological capabilities with business startups and innovation, supporting the growth of high-tech small and medium enterprises (SMEs).

While previous plans already primed Chinese companies to become central actors in the national economic development, the 13th plan fully commits to creating a type of development driven by innovation and steward by the private sector through market-oriented science and technology programs – domestically and abroad. National technological innovation programs are proposed to enhance private sector innovation,

including “to establish industry associations for technological innovation, develop new types of market-oriented research institutes, and give impetus to collaborative innovation across fields and industries” (China, 2016, p. 24).

International cooperation on technological development also receives a different ambition. Technical assistance to other developing countries remains; however, more attention is given to place China as a leader in international STI development, including frontier technologies and the service sector. Closely mirroring Archibugi and Michie (1995) definition of ‘global generation of technology’, the 13th plan aims to “build a global innovation-driven development network for emerging industries, encourage Chinese enterprises to allocate innovation resources globally, and support the establishment of overseas research and development centers” (China, 2016, p. 66). Special attention is also given to transforming Beijing and Shanghai into internationally influential scientific and technological innovation centers.

Direction of innovation

The direction of innovation is much more ambiguous than the previous plans, as efforts are made to deepen China’s integration to global markets, but with the explicit intention of boosting China’s leadership role in multiple sectors. The ‘Made in China 2025’ initiative is mentioned multiple times as the main policy to modernize Chinese industries and increase their competitiveness and international reach. However, innovation is not only directed towards industrialization, but it also becomes a product on itself too. The 13th plan supports the commercialization of STI, proposing “systems and mechanisms that help to unleash creativity, ensure efficient application of the outcomes of innovation, and fully reward innovation” (p. 27).

The plan also factors the role of domestic demand in stimulating growth, nurturing new drivers of economic growth. This includes expanding domestic spending by increasing consumer buying power, improving market expectations, and enhancing transregional interconnectivity to boost the rural potential for consumption. This shift is associated with a growing urban middle-class in the country. It also signals China’s changing position in the global economy, from the world’s factory to the world’s largest consumer market.

Innovation is also applied to environmental and social concerns. The plan guides efforts towards "energy-saving and environmentally friendly engineering, technology, and equipment manufacturing, and research, develop, demonstrate, and disseminate a number of advanced, environmentally friendly technologies and equipment" (p. 140). This can be contextualized both as a commitment to international standards and a business opportunity to provide to the growing demand for green products and solutions. Chinese cultural production and consumption are also emphasized as valuable international cultural exchanges and new markets.

The trend of applying information technologies to military goals continues, although it receives comparatively less attention than in the previous plan. It is worth mentioning that the 13th plan calls for developing Chinese-style modern armed forces.

Normative framework

The normative framework of the 13th plan is also more techno-globalist, as it focuses on policies to promote opening-up, remove institutional barriers and align national industries with international standards. As discussed, this plan deepens the principle of market orientation, assigning the leading role of promoting innovation-driven development to the private sector. The plan also indicates a more substantial commitment to following and creating international standards, particularly regarding cyberspace security. The plan also recommends cohesion between technological standards adopted by China and countries of the Belt and Road Initiative.

In contrast to the techno-nationalist vision of innovation as a strategic resource that needs protection, the 13th plan indicates a less defensive approach. The plan encourages the reduction of institutional barriers to enable the commercialization of the results of innovation, including the export of advanced technologies and high-end equipment. Furthermore, it seems to corroborate the trend of domestic consumption becoming a significant driver for China's economic growth, as Chinese consumers can spend more on sophisticated and varied products.

However, from a constructivist perspective, it could be argued that the normative framework that permeates the 13th plan has a techno-nationalist nature despite its techno-globalist characteristics. Innovation-driven development is not only an economic goal, but also becomes a pathway to achieve global leadership, particularly

in strategic fields such as digital technologies, which have also been identified as crucial for national defense. Furthermore, the historical blend between China's socialist values and nationalism should also be considered. The plan emphasizes Maoism as one of its guiding principles, which is internationalist and anti-imperialist, as discussed in section 4.1.2. While the current international context is very different from Mao's period, the Chinese identity that has been constructed in the last decades seems to identify a more intense international antagonism and thus adapt accordingly. This can be exemplified by the evolving anti-Japanese nationalism described in section 4.1.3.1 and diplomatic clashes and trade wars with the United States.

4.2.5 Fourteenth Five-Years Plan (2021-2026)

In the 14th plan (China, 2021), the innovation-driven strategy becomes central to China at a civilizational level, as the Government aims to deeply implement the strategy of reinvigorating China through science and education, transforming itself into a science and technology (S&T) powerhouse. Scientific progress, particularly on digital technologies, seems to become an identifying symbol of Chinese national identity and culture, akin to how earlier technological aptitudes were associated with certain nationalities in the early 20th century (Edgerton, 2007, p. 2). Table 4.5 pinpoints the predominance of the techno-nationalist paradigm, as China seems to direct its STI capabilities inwards and to the future.

Table Error! No text of specified style in document.**.5**

Code frequency of approaches in the Fourteenth Five-Years Plan (2021-2026)

Category	Approach	Codes	Predominance of approach
Creation	Techno-Globalism	8	38%
	Techno-Nationalism	13	62%
Direction	Techno-Globalism	9	33%
	Techno-Nationalism	18	67%
Normative Framework	Techno-Globalism	12	60%
	Techno-Nationalism	8	40%

Creation of innovation

The 14th plan indicates a new stage in Chinese STI development, as the country prioritizes advanced frontier technologies. The plan reiterates the national commitment to adhere to the core position of innovation in China's overall modernization, the importance of STI self-reliance and self-improvement as strategic support for national development, and its orientation towards pioneering the world's cutting edge science and technology. To this end, the plan advocates for the leadership role of Chinese private companies of all sizes, national laboratories, engineering research centers, and national technology innovation centers to construct strategic STI power.

As the country progresses to uncharted areas of science, the plan grants more autonomy to scientific research units and research personnel, implementing more robust evaluation mechanisms to enable free exploration and task-oriented projects, including establishing evaluation mechanisms for non-consensus projects. Beyond increasing the number of research programmes, the 14th plan also gives attention to nurturing the spirit of innovation of scientists for the new era, with a focus on promoting integrity in scientific research and improving the STI ethics system. Indeed, ethics and morality are also defined in the plan, as it explicitly advocates for the harmonization of natural and social sciences and the Sinicization of research efforts:

> "We will strengthen the holistic and systematic research on, publication and dissemination of, and propaganda on and interpretation of Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era and promote the Sinicization, modernization, and popularization of Marxism. We will implement Marxist theoretical research and construction projects in an in-depth manner, promote the construction of the Research Center (Institute) for Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era and the Research Center for the theory system of socialism with Chinese characteristics, and build and make good use of learning platforms such as "Xuexi Qiangguo". We will construct curricula systems, academic systems, and discourse systems for philosophy and social sciences with Chinese characteristics, implement philosophy and

> social science innovation projects in an in-depth manner, and strengthen the construction of new think tanks with Chinese characteristics." (p. 83)

On the other hand, the plan is remarkably techno-globalist in its support for international knowledge exchanges. It advocates for the establishment of international science and technology organizations within China and the opening of national programs to international participation. It proposes several major STI cooperation projects, including global scientific research funds and exchange programs in Chinese universities and research institutions. Cooperation with countries participating in "Belt and Road" initiative receives special attention, as the plan highlights the implementation of the "Belt and Road" innovation action plan and building a Digital Silk Road and Innovative Silk Road.

Direction of innovation

As the 14th plan assigns a more profound civilizational role to technological development, STI gets directed towards creating a long-term vision for the future of China. To this end, the plan integrates long-range objectives up to 2035, when it is expected that China will have realized socialist modernization and enter the first rank of innovation-oriented countries.

Frontier technologies receive primacy, as the plan proposes the establishment of national laboratories focused on quantum information, photonics, micro and nanoelectronics, network communications, artificial intelligence (AI), biotechnology and pharmaceuticals, modern energy systems, and other advanced scientific fields.

The plan continues the trend to improve productivity to push Chinese products, services, technologies, brands, and standards to go global. But it also becomes more explicit that STI development is guided towards fulfilling and creating new national needs. The plan encourages new types of national consumption to be cultivated, including information consumption, digital consumption, and green consumption.

Innovation is also directed towards cultural projects and to enhance the functions of grassroots comprehensive cultural service centers, including the development of public digital cultural venues such as public libraries, cultural centers,

art galleries, and museums. Internationally, national capabilities are directed towards what is called humanistic cooperation, in the fields of public health, digital economy, green development, poverty reduction, human resource development, science and technology education, culture and art, and humanitarian aid for emergencies.

Normative framework

Aligned with its vision of developing the domestic economy, the topic of reducing trade barriers gains prominence. The 14th plan advocates opening up the service industry to the outside, further relaxing market access, and comprehensively cleaning up unreasonable restrictions. It also aims to promote trade liberalization for products and services and significantly reduce import tariffs and institutional costs in order to expand imports of high-quality consumer goods.

The plan also has a distinct concern with the internet's regulatory framework. It fosters international cooperation in formulating international rules for digital spaces, including establishing a multilateral, democratic, and transparent global internet governance system. It also indicates China’s intention to actively participate in the formulation of international rules and digital technology standards in data security, digital currency, and digital taxes. The plan also encourages online cultural exchanges and mutual learning; however, this apparent digital cosmopolitanism does not seem to be backed by any policy to reduce Chinese Internet users' restrictions on many international websites.

4.2.6 Comparison of each plan by category

In the 10th plan, the noun “innovation” and variations (“innovations”, “innovative”, “innovate”, “innovating”, “innovator” and "innovativeness”) amount to only 14 occurrences, or about 1,15 per thousand words. In the following plans, the number rises to 2,56 (11th), 4,85 (12th), 3,19 (13th), and 3,16 counts per thousand (14th). With this evolution in mind, this section will compare each plan by category to identify trends and reoccurring themes.

4.2.6.1 Creation of innovation

Table 4.6 presents a summary of the defining characteristics of each plan regarding the creation of innovation:

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Comparative code frequency of approaches regarding the creation of innovation (2001-2025)

		Codes and frequencies per plan									
		10th Five-Year Plan (2001-2005)		**11th Five-Year Plan (2006-2010)**		**12th Five-Year Plan (2001-2015)**		**13th Five-Year Plan (2016-2020)**		**14th Five-Year Plan (2021-2025)**	
Approach	**Techno-Globalism**	5	42%	11	31%	4	44%	30	56%	8	38%
	Techno-Nationalism	7	58%	24	69%	5	56%	24	44%	13	62%

10th Five-Year Plan (2001-2005): The creation of innovation is explicitly linked to the opening of China to the outside world. It adopts pragmatic techno-nationalism, which acknowledges the crucial role of transnational companies, but that industrial capability should be built in the national territory.

11th Five-Year Plan (2006-2010): Emphasis on the need for independent creation of innovation in nearly all fields. Guide foreign capitals to be invested in the high tech industry and domestic enterprises to conduct multi-form cooperation with MNEs and capitalize on the technology spillover effect from foreign capitals.

12th Five-Year Plan (2011-2015): Adopts indigenous innovation as a core principle of Chinese economic development, indicating the transition of China towards identifying itself as an innovative-type country.

13th Five-Year Plan (2016-2020): Embraces the idea of becoming an innovation-driven economy. Chinese companies to become central actors for economic development, taking a leading role in market-oriented STI programs, domestically and abroad. More attention is given to transforming China into an international leader in STI development, including frontier technologies and the service sector.

14th Five-Year Plan (2021-2025): Sinicization of research efforts. Orientation towards reaching the world's cutting edge on STI while promoting self-

reliance and self-improvement as strategic support for national development. Advocates for international knowledge exchanges, establishing international STI organizations within China, and opening up national STI programs to international participation.

4.2.6.2 Direction of innovation

Table 4.7 presents a summary of the defining characteristics of each plan regarding the direction of innovation:

Table 4.7

Comparative code frequency of approaches regarding the direction of innovation (2001-2025)

		Codes and frequencies per plan									
		10th Five-Year Plan (2001-2005)		**11th Five-Year Plan (2006-2010)**		**12th Five-Year Plan (2001-2015)**		**13th Five-Year Plan (2016-2020)**		**14th Five-Year Plan (2021-2025)**	
Approach	**Techno-Globalism**	11	52%	9	32%	10	56%	13	42%	9	33%
	Techno-Nationalism	10	48%	19	68%	8	44%	18	58%	18	67%

10th Five-Year Plan (2001-2005): Innovation applied to improve national productivity, but still in the context of an export-oriented economy without much attention to more political and strategic uses.

11th Five-Year Plan (2006-2010): Independent innovation capabilities directed towards reducing technological dependence in virtually all fields. Need to fulfill external demand not only through partnerships with MNEs, but also via independent Chinese enterprises and brands.

12th Five-Year Plan (2011-2015): Innovation directed towards placing China on high grounds for the future competition in STI. Stronger push to apply innovation towards environmental objectives.

13th Five-Year Plan (2016-2020): Efforts are made to deepen China's integration into global markets, but with the explicit intention of boosting China's leadership role in multiple sectors. Innovation is not only directed towards industrialization, but it also becomes a product in itself. STI is directed towards fulfilling both foreign and domestic demand, nurturing new drivers of economic growth.

14th Five-Year Plan (2021-2025): Deeper civilizational role to technological development. STI gets directed towards shaping the future of China. Cultivation of new types of national consumption is encouraged.

4.2.6.3 Normative framework

Table 4.8 presents a summary of the defining characteristics of each plan regarding the normative framework:

Table 4.8

Comparative code frequency of approaches regarding the normative framework (2001-2025)

		Codes and frequencies per plan									
		10th Five-Year Plan (2001-2005)		11th Five-Year Plan (2006-2010)		12th Five-Year Plan (2001-2015)		13th Five-Year Plan (2016-2020)		14th Five-Year Plan (2021-2025)	
Approach	Techno-Globalism	12	67%	8	32%	11	85%	25	63%	12	60%
	Techno-Nationalism	16	33%	14	68%	2	15%	15	38%	8	40%

10th Five-Year Plan (2001-2005): Emphasis on market reforms to create a more competitive environment, reflecting China's commitment to the WTO. Calls for reform of state-owned enterprises to compete as equals in the market economy. Encourage more participation by all elements of society in the policy priority-setting.

11th Five-Year Plan (2006-2010): Nationalism explicitly embedded in the national innovation system through basic education and cultural industry. Guide foreign

merchants to participate in the restructuring and innovation of domestic enterprises on the basis of protecting domestic independent brands.

12th Five-Year Plan (2011-2015): Expands the principle of market orientation, enterprises' independent decision-making, and the separation between government and non-government functions. Ambitious standards for laws, regulations, and standardization systems for environmental protection. Emphasis on the socialist values intertwined with national identity.

13th Five-Year Plan (2016-2020): Policies to promote opening-up, remove institutional barriers and align national industries with international standards. Private sector to have a leading role in promoting innovation-driven development.

14th Five-Year Plan (2021-2025): Opening up the service industry to the outside, further relaxing market access, and comprehensively cleaning up unreasonable restrictions. Explicit message of ethnic unification and forging a solid community consciousness for the Chinese nation. It aims to establish an online Chinese civilization.

4.2.7 Comparative analysis of plans

Each plan identifies areas of economic interest to be developed; presents projects of economic impact ranging from small, regional STI laboratories or hubs of specific economic sectors to massive infrastructure projects – all of them expected to have a net effect of invigorating the market. The plans show public interest in exerting significant guiding influence on the national economy by directly and indirectly swaying private stakeholders.

General education, natural sciences, and humanities research are also mentioned in all plans. In all cases, preserving and deepening scientific and educational autonomy is pledged, including schools. This also includes attracting talent from abroad and the domestic development of highly skilled students, professors, workers, and researchers in all areas, especially in STEM-related subjects.

There are clear recommendations of technologies that should be employed or developed in critical areas such as medical and health care services, farming, and small-scale civil construction. However, most of the time, there is no clear explanation

on how this would be achieved, which is expected from high-level national policies. Aside from economic questions, which occupies a large part of the texts, the plans direct STI efforts towards a wide range of societal issues, of which were notable: Environment and resources management, land use and farming, grain production and trade by small farmers, population management, administrative issues, social assistance, health care (with emphasis on traditional Chinese medicine) and education.

In the first plans, science, technology, and innovation are mainly fertilizers for the market economy, which intensifies and supports industrialization. However, the perception of innovation started to shift in the mid-2000 and gradually evolved into a deeper, civilizational meaning. Particularly in later plans, innovation is mentioned as a solution or an end in itself, even if only in a generic fashion, concerning many or most topics that are not market-related, such as specific public policy challenges, environmental protection or any processes or procedures.

Starting from the 11th plan, China takes a much stronger stance on the strategic importance of the indigenization of strategic technologies and industries, either because autonomy would mean better economic results or desirable because of national defense strategy.

The 12th plan says that China will accelerate building an innovative-type country. The idea of innovation is mainly associated with science, business, and, to a lesser degree, culture and management. At the same time, innovation already appears as a value connected to the path of socialism with Chinese characteristics. It promises to "greatly promote the innovation system building of philosophy and social sciences, implement the innovation projects on philosophy and social sciences" (China, 2011, p.42).

The 13th plan signals the adoption of innovation as the central development strategy, which is referred to as "innovation-driven development". It still perceives the country's capacity for innovation as insufficient; therefore, its goal is to improve China's national capacity for innovation, which may provide an inexhaustible driving force for economic and social development. The plan has extensive parts dedicated to creating and nurturing innovation, as it integrates the idea of innovation into all aspects of society:

> "Innovation must be placed at the heart of China's development and advanced in every field, from theory to institutions, science, technology, and culture. Innovation should permeate the work of the Party and the country and become an inherent part of society." (China, 2016, p. 20).

And later:

> "With innovation as the basis from which to pursue development, we will give a central role to innovation in science and technology and a supporting role to the development of talent, closely integrating scientific and technological innovation with business startups and innovation by the general public in order to achieve leading-edge development that relies more on innovation as its driver and offers greater incentives for first innovators." (p. 22)

The scientists and entrepreneurs are also acknowledged as individual agents responsible for this innovation-driven development. To this end, national values, Chinese culture, and humanities study also receive more attention than in previous plans. In particular, social science is highlighted as a tool for protecting and developing the national values system and is portrayed as intrinsically tied to Marxist and Maoist principles.

The 14th plan indicates complete confidence in China's innovative capabilities, encouraging Chinese companies to lead global innovation efforts. According to the plan, China considers "reform and innovation as the fundamental driving force" of development and "will enter the first rank of innovation-oriented countries" by 2035. However, while there is strong evidence to suggest a techno-globalist shift regarding the creation of innovation, it could also be argued that such internationalization is only possible due to the maturing of China's national innovation system. In this context, the national capabilities of Chinese firms have been nurtured enough to compete among themselves and international competitors in the Chinese market.

Continuing the trend seen earlier, national values, culture, education, and innovation are evermore connected in the 14th plan, with additional emphasis on the

spiritual side of innovation. The plan advocates that education policies must develop students' spirit of innovation; it highlights China's wishes to implement philosophy and social science innovation projects in-depth and educate the people with the Party's innovative theories.

The creation of innovation on itself also seems to be reinforced as part of China's national unification strategy. The plan states that China will "encourage compatriots on both sides of the Taiwan Strait to jointly pass on, innovate, and develop China's excellent traditional culture". Akin to a "carrot and stick" approach, the 14th plan promotes transregional STI cooperation as a way to integrate mainland China and Taiwan. However, at the same time, it vows to "remain highly vigilant and resolutely curb Taiwan independence and separatist activities", restating that: "We will unite the broad masses of Taiwan compatriots to jointly oppose Taiwan independence" (p. 137). The plan also adheres to a more explicit message of ethnic unification:

> "[The government shall] adhere to and refine the system of regional ethnic autonomy, forge a strong community consciousness of the Chinese nation, and promote for all nationalities a common unity in struggle and a common prosperity in development. We will implement the Party's basic guiding principles on religious work, adhere to the direction of the Sinicization of China's religions, and actively guide the mutual adaptation of religions and socialist society."

Moreover, the approach to ethnic diversity within China has also evolved in the last decades. The 11th plan includes policies such as "construct minority folk traditional cultural community, support minority publication cause and establish bilingual teaching demonstration zone.", interest in strengthening regional political autonomy, and "comprehensive implement the policy of freedom of religion, legally manage religious affairs, uphold the principle of self-administration and running religious affairs independently and guide the accordance between religious beliefs and socialist society."

However, the growing centrality of STI to the development of China is correlated with a more assertive position towards national unity. While still acknowledging the uniqueness of different groups, the 13th plan is more ambiguous

about inclusive participation than its predecessors, defining broadly the characteristics of who should take part in innovative activities. For instance, it vows to "channel great energy into advocating and standardizing the usage of the standard Chinese language", but also wants to "move ahead with bilingual education, and strengthen bilingual teacher training". It has many plans to support ethnic minority culture – including a program devoted to creating news, publishing outlets and films directed to these groups – but also states: "We will expand efforts to create ethnic unity and progress demonstration areas and promote communication, exchange, and blending between ethnic groups" (China, 2016, p. 113). By the 14th plan, there is no mention of minority languages or bilingual education. On the contrary: "We will raise the quality and level of education in ethnic minority regions and intensify efforts to popularize the national common language and writing system." (China, 2021, p. 105). And further:

> "We will focus on forging a strong community consciousness of the Chinese nation, increase support for the development of ethnic minority regions, carry out comprehensive, in-depth, and lasting propaganda on, education on, and creation of national unity and progress, and promote exchanges and integration among all ethnic groups." (p. 81)

4.3 Discussion of key findings

The embracing of a techno-globalist normative framework seems nearly constant throughout the plans; however, this comfortable internationalization should be contextualized in light of China's particular national identity and values.

As discussed in section 4.1.3, China adopted a "socialist market economy" strategy in the 1970s, which combines classical Marxist and socialist thought, philosophical works of historical and current CCP leaders, and a pro-market economic strategy. These two elements - socialism and the market - appear in all five plans in seeming harmony. To varying degrees, all plans emphasize the strategic efforts to be made by the Government to develop a market economy, which include commodification, retraction of state from economic spaces, the evolution of legislative and general regulations to facilitate for-profit activities, significant accumulation of private capital, overall desire to see increased commercial activity, creation of

successful private companies, and the promotion of international and open trade. Particularly in later plans, the Chinese government holds that private, profit-lead entities should steer innovative economic activities, while the state only operates directly on a few strategic areas and supervises the flourishing innovation ecosystem.

On the other hand, the Chinese market economy is not totally "free" in a liberal sense either. The Chinese Government remains mindful and active in preventing the concentration of economic and political power on few private entities outside of the government, as exemplified by the recent crackdown on IT giants accused of financial crimes (out of which, Jack Ma's Alibaba Group has received the most international attention). Furthermore, reform and opening up to the global economy did not lead to embracing the techno-globalist position that, in an open market, there is no need for countries to pursue technological independence. While China has abandoned the isolationist approach long ago, it has remained integrated into the global network to attain further technological autonomy and advance its national interests.

The nationalist component of the socialism with Chinese characteristics framework has become more evident in the recent plans, which define the beliefs and values that citizens must enforce to promote the Chinese civilization. The most notable characteristics of these beliefs, as stated in the plans, are the centrality of the state highest political organs in leading the way for the whole of society; strict adherence to the doctrines issued by the state; complete unity of the whole country, including all territories, nations, and peoples of China; and, finally, the moral virtues of said beliefs. Those are mainly present in passages dealing with education, international relations, divisive domestic questions, political structure, and cultural production.

An illustrative case of the interconnection between innovation, modernity, culture, education, and nation-building can be identified regarding the participation of different groups in the paradigm of China's innovation-driven development. The standardization and dissemination of a homogenous language and culture, particularly scientific values and symbols, resembles in many ways the process of nation-building and modernization described by Gellner (2000) in section 2.1.1.

As China aims to become an innovation-driven economy, it becomes essential to have an educated population capable of executing advanced scientific and technological works. To efficiently direct and nourish the innovative potential of the

population towards high-level national goals, it is beneficial if all individuals could speak the same language at very technical levels, recognize the same symbols and understand the same cultural framework. Furthermore, as cultural dissemination happens through mass education and socialization, public policies to standardize education and regulate public spaces (physical and virtual spaces) also promote the cultural identity that policymakers want to create.

Additionally, the inclusion of online socialization as a new cultural diffusion mechanism also promotes the flow of the elite culture. Unlike the traditional mechanisms of culture acquisition, such as social interaction in families and communities, online environments are less constrained by physical proximity, which facilitates the creation of a unified online culture at a national level. Such online culture is dynamic and democratic, enabling any Chinese citizen with internet access to be a consumer and creator of the national online culture. On the other hand, the gradual expansion of connectivity gave a head start to earlier adopters – the cultural elites from the main economic centers – to set the conventions of this online culture as it began. In comparison, later adopters must now learn the existing cultural framework while also being constrained by it. Echoing how Gellner described the transition from agrarian to modern societies in Europe, in China's innovation-driven economy, participation in the online national culture is becoming a requirement for Chinese citizens to participate in social activities fully, find employment, and access many public services.

The construction of online Chinese culture is also dependent on innovation for the simple reason that there is no traditional online Chinese culture. Many traditional and ethnic symbols cannot be expressed online (e.g., ethnical characteristics, clothes, architecture) or need to be reimagined to fit a new virtual environment. At the same type, the evolving nature of digital technologies means that new devices and platforms are being created constantly, enabling new forms of cultural and nationalist manifestations.

Finally, China's commitment to global leadership also assures its sovereign right to use and shape the standards of future technologies. The emerging technologies of the 4th Industrial Revolution, such as advanced materials, robotics, artificial intelligence, big data and blockchain, could bring productivity gains to all economies, reducing costs and improving productivity. However, due to the high costs and risks

involved in generating innovations at the frontier of knowledge, only a few countries will have the opportunity to shape the standards of crucial technologies and own the sophisticated equipment and intellectual property rights needed to produce them.

While other nations could also benefit from such innovations as users, their ability to adapt and reinvent said technologies will be limited by intellectual property licensing contracts, lack of technical skills, and insufficient resources. Such technological asymmetry could intensify international inequalities as developing nations need to pay developed nations for the right to use their technologies. Furthermore, while the latter may see new jobs emerging from the digital revolution, developing countries are particularly vulnerable since their industrial matrix rely heavily on MNEs and foreign markets. As automation becomes cheaper, international companies may be less interested in offshoring manufacturing to reduce costs or prefer to re-shore production to their home countries (Carbonero Ernst, & Weber, 2018). Without proper regulatory oversight, the 4th Industrial Revolution may potentially become a matter of sovereignty for developing countries since critical decisions regarding their national economy and politics may be at the hands of international firms and foreign governments. Therefore, by pioneering cutting-edge STI development, China will have the opportunity to claim ownership of vital intellectual properties, set standards, and regulate emerging technologies in ways that are compatible with Chinese national capabilities and values.

With all this considered, the arguments presented in section 2.2 do not fully explain Chinese technological development since its unique blend of socialism and nationalism does not fit neatly into the Realism or Liberalism theoretical frameworks. China adopts strategies such as decisive government intervention to promote STI, market deregulation to nurture private-led enterprises, intensification of global trade, promotion of global research network, the attraction of FDI, and strengthening national capabilities in emerging STI-intensive industries. China's plans were always incorporated in the international context, so there is no evidence of it being autarkic or isolationist. On the other hand, the commitment towards internationalization may not be simply attributed to economic pragmatism, as internationalization has been an ideological commitment since the very formation of the PRC. The same could also be

said about China's impetus towards social development, sustainability, and equality, which are guided by its socialist value system.

The 5-year plans reflect the Government's intention of heading a socialist country that operates on a capitalist economic structure – or, on a metaphor, running the software for a "spiritually socialist civilization" on a "liberal market hardware". The place of each is delimited: There is a space for capitalism, which is the economic and social creation of value under a market system; and there is the space of socialism with Chinese characteristics, which is the space of knowledge, political action, and the normative value system of all citizens. The result is a powerful centralized government guiding a liberalized market economy in accordance with, and for the benefit of, its national interests and identity. Therefore, China adopts elements of a techno-globalist strategy to serve techno-nationalist ends.

CHAPTER 5
CONCLUSIONS

Answering the central question of this research on the influence of Chinese nationalism in China's strategy towards becoming an innovation-driven economy, the 5-year plans demonstrate a mixed approach, with elements of both techno-globalism and techno-nationalism. The role of innovation may vary at different times and sectors of the economy and society; however, there are no radical shifts in opinion concerning the long-term goals of national development. Although changes in power inside the CCP seem to impact the priority-setting, most of the variation appears to be motivated by external forces, with worldwide changes in the political climate triggering tactic modifications. This strategic repositioning stands on the stability and flexibility of China's long-term vision for STI independence, which can be summarized in the following assumptions:

1. Science, technology, and innovation are critical components to China's future and, as such, should be vigorously pursued.
2. China must become independent and autonomous concerning STI. For that, it needs a skilled workforce, proper legal, regulatory, and economic environment, financial resources (external and domestic, public and private), national ownership of intellectual property, manufacturing capacity and market access, telecommunications infrastructure, and military strength.
3. Global trade, market liberalization, and FDI are valuable pathways to make the country wealthier and drive technology transfer, granting China more autonomy and an internationally advantageous position.
4. On the other hand, China seems to recognize that acquiring foreign technology and dependence on global markets is not adequate to achieve its development goals in the long run. Therefore, it balances its 'go-global' strategy with expanding domestic consumption and national productive capabilities.

The centrality of innovation has grown substantially since the publication of the 10th plan, and it has now become a pillar of the 14th plan. The importance of STI to Chinese policymakers has also shifted qualitatively. It begins as a tool for economic development; however, particularly in the later plans, the concept of innovation became ubiquitous and is applied as a panacea for all problems, from crime prevention to environmental issues. Innovation becomes a prized value and virtue that the Government explicitly advocates for as something that all public organizations, private entities, and citizens shall pursue. China wants every individual to help forge an innovative society and innovation to become part of the spirit of its people as a defining characteristic of Chinese socialism.

The connection between national aspirations, values, and identity, and China's policies to develop an innovation-driven economy becomes evident by the 12th plan and is made explicit in the 14th plan, which describes the centrality of STI to create an advanced, digital and prosperous nation. In many ways, China's approach towards the 4th Industrial Revolution mirrors the transition from agrarian to industrial societies in Europe described by the Modernist theories of nationalism. Despite the ubiquitous presence of digital technologies since the 1990s, the internet is still an expanding frontier, requiring the development and dissemination of new skills, knowledge, and symbols while also enabling new forms of production and cultural expression. This ongoing nation-building effort is a central component of China's policies to construct an innovation-driven economy with Chinese characteristics, which mostly validates the predominance of a techno-nationalist paradigm.

Under such terms, China's STI strategy may not conform with a peaceful rise nor with a grand strategy for world domination. On the one hand, conflicts are endemic to nation-building efforts, and China has declared its willingness to use advanced technology for conflict resolution. At the same time, China's eagerness to achieve autonomous innovation capabilities seems to emerge not from imperialist tendencies but from a desire to pursue an independent development path, a freedom denied by centuries of foreign intervention in national and regional affairs. Moreover, additional research is needed to explain if the adoption of some liberal attributes of techno-globalism can be credited to political pragmatism and rational choice calculations (following mainstream Realism and Liberalism theories), adaptation to

international norms, or a genuine commitment to global social progress as part of the construction of its unique Chinese socialist spiritual civilization.

On a final note, China's desire to have a say in the standards of future technologies and make sure they are compatible or even favor their national attributes is not unlike that of other developed nations. The innovators of the past have set the conventions of our current world: Western Europe and the United States have an unquestionable global influence on the current scientific practices and mass culture; the fact that this research has to be written in English to reach a broader audience serves as a gentle reminder of this. Likewise, the COVID-19 pandemic unveiled the vulnerability of excessive dependency on global markets, as many developing countries have struggled to import, and let alone produce, crucial medical equipment, supplies, and vaccines.

The mandate to serve and protect their nation's best interest is at the core of all governments. China's willingness to be more than a consumer of foreign innovation, but to invest in their national STI capabilities and influence future technological standards should encourage other nations from the Global South to also reflect on their own STI resilience. After all, the benefits of STI should not be exclusive to a few developed countries. With technological innovation increasingly becoming the main driver of economic growth and prosperity, developing national STI capabilities should be considered a matter of national sovereignty, as it enables nations to actively participate in the construction of a world suitable to the needs, abilities, and values of their people and its future generations.

REFERENCES

Akiyama, H. (2019, December 31). *Japan to expand role as free trade champion in 2020*. Nikkei Asia. https://asia.nikkei.com/Economy/Trade/Japan-to-expand-role-as-free-trade-champion-in-2020

Alden, C., & Aran, A. (2016). *Foreign policy analysis: New approaches* (2nd ed.). Routledge.

Allen, G. C. (1983). *A short economic history of modern Japan* (4th ed.). Palgrave Macmillan.

Anderson, B. R. O. (2008). *Comunidades imaginadas: Reflexões sobre a origem e a difusão do nacionalismo* [Imagined communities: Reflections on the origin and spread of nationalism]. Companhia das Letras.

Archibugi, D., & Michie, J. (1995). The globalisation of technology: A new taxonomy. *Cambridge Journal of Economics*, *19*(1), 121-140. https://doi.org/10.1093/oxfordjournals.cje.a035299

Barbieri, K., & Schneider, G. (1999). Globalization and peace: Assessing new directions in the study of trade and conflict. *Journal of Peace Research*, *36*(4), 387-404. https://doi.org/10.1177/0022343399036004001

Barnett, M., & Finnemore, M. (2004). *Rules for the world: International organizations in global politics*. Cornell University Press.

Bergen, R. (1998). Japanese nationalism: Ancient and modern. *Annual Report of the Institute for International Studies*, *1*, 49-59.

Billig, M. (1995). *Banal nationalism: Theory, culture and society*. Sage.

Bitzinger, R. A. (2015). Defense industries in Asia and the technonationalist impulse. *Contemporary Security Policy*, *36*(3), 453-472. https://doi.org/10.1080/13523260.2015.1111649

Burns, A. (2009). Innovation and growth chasing a moving frontier. In C. A. P. Braga, P. C. Padoan, V. Chandra, & D. Eröcal (Eds.), *Innovation and growth: Chasing a moving frontier* (pp. 169–202). OECD Publishing.

Carbonero, F., Ernst, E., & Weber, E. (2018). Robots worldwide: The impact of automation on employment and trade. *ILO Working Paper No. 36*.

https://www.ilo.org/wcmsp5/groups/public/---dgreports/---inst/documents/publication/wcms_648063.pdf

Calhoun, C. (2008). O nacionalismo importa [Nationalism matters]. In D. H. Doyle & M. A. Pamplona (Eds.), *Nacionalismo no mundo* [Nationalism not world] (pp. 37–70). Record.

CEPAL. (n.d.). *Terms of trade: Raúl Prebisch and the challenges of the XXI century*. https://biblioguias.cepal.org/ld.php?content_id=31791956

Chesnais, F. (2010). National systems of innovation, foreign direct investment and the operations of multinational enterprises. In B. Å. Lundvall (Ed.), *National systems of innovation* (pp. 259–292). Amsterdam University Press.

China, People's Republic of. (1982). *Constitution of the People's Republic of China.*

China, People's Republic of. (2005). The outline of medium and long term plan for national science and technology development 2006–2020. *The State Council issue No. 44.* https://www.itu.int/en/ITU-D/Cybersecurity/Documents/National_Strategies_Repository/China_2006.pdf

China, People's Republic of. (2006). *Guidelines of the eleventh (2006–2010) five-year plan for national economic and social development*. State Council of China. https://policy.asiapacificenergy.org/node/115

China, People's Republic of. (2011). *Twelfth five-year plan (2011–2015) for national economic and social development*. https://policy.asiapacificenergy.org/node/37/portal

China, People's Republic of. (2016). *Thirteenth five-year plan (2016–2020) for national economic and social development*. Central Committee of the Communist Party of China. https://policy.asiapacificenergy.org/node/2509

China, People's Republic of. (2021). *Outline of the People's Republic of China 14th Five-Year (2021–2025) Plan for national economic and social development and long-range objectives for 2035*. Center for Security and Emerging Technology. https://cset.georgetown.edu/wp-content/uploads/t0284_14th_Five_Year_Plan_EN.pdf

Corsi, C., & Kudrya, S. (2012). *Globalization of science and technology: A way for C.I.S. countries to new markets* (Original work published 1998). Springer.

Edgerton, D. E. (2007). The contradictions of techno-nationalism and techno-globalism: A historical perspective. *New Global Studies*, *1*(1). https://doi.org/10.2202/1940-0004.1013

Emmers, R. (2010). *Japan-Korea relations and the Tokdo/Takeshima dispute: The interplay of nationalism and natural resources* [RSIS Working Paper; 212/10]. Nanyang Technological University. https://hdl.handle.net/10356/90571

Fietta, V. (2010). *Constructivist theories of international relations: Wendt, Finnemore and Katzenstein*. [Unpublished manuscript]. https://www.academia.edu/4179790/Constructivist_Theories_of_International_Relations_Wendt_Finnemore_and_Katzenstein

Gellner, E. (2000). O advento do nacionalismo e sua interpretação: Os mitos da nação e da classe [The advent of nationalism and its interpretation: The myths of nation and class]. In G. Balakrishnan (Ed.), *Um Mapa da Questão Nacional* [A map of the national question] (pp. 107–154). Contraponto.

Gries, P. H. (1999). *Face nationalism: Power and passion in Chinese anti-foreignism* (Thesis).

Habermas, J. (1995). O Estado-nação europeu frente aos desafios da globalização [The European nation-state facing the challenges of globalization]. *Novos Estudos CEBRAP*, *3*(43), 87–102. http://novosestudos.com.br/produto/edicao-43/

Hagedoorn, J., Link, A. N., & Vonortas, N. S. (2000). Research partnerships. *Research Policy*, *29*(4–5), 567–586. https://doi.org/10.1016/s0048-7333(99)00090-6

Hallward-Driemeier, M., & Nayyar, G. (2017). *Trouble in the making?: The future of manufacturing-led development*. World Bank Publications.

He, B., & Guo, Y. (2000). *Nationalism, national identity and democratization in China*. Ashgate.

Held, D. (1999). *Global transformations: Politics, economics, and culture*. Stanford University Press.

Held, D., & McGrew, A. (2007). *Globalization / anti-globalization: Beyond the great divide* (2nd ed.). Polity.

Herz, M., & Hoffman, A. R. (2004). *Organizações internacionais: História e praticas* [International organizations: History and practices]. Elsevier.

Hobsbawm, E. J. (2012). *Nations and nationalism since 1780: Programme, myth, reality*. Cambridge University Press.

Horie, Y. (1952). Foreign trade policy in the early Meiji era. *Kyoto University Economic Review*, *22*(2), 1–21.

Hsieh, H. F., & Shannon, S. E. (2005). Three approaches to qualitative content analysis. *Qualitative Health Research*, *15*(9), 1277–1288. https://doi.org/10.1177/1049732305276687

Hu, A. (2013). The distinctive transition of China's five-year plans. *Modern China*, *39*(6), 629–639. https://doi.org/10.1177/0097700413499129

Hughes, C. R. (2006). *Chinese nationalism in the global era*. Routledge.

Kang, D. (2007). *China rising: Peace, power, and order in East Asia* (Illustrated ed.). Columbia University Press.

Kaplan, D. M. (Ed.). (2009). *Readings in the philosophy of technology* (2nd ed.). Rowman & Littlefield.

Karns, M. P., Mingst, K. A., & Stiles, K. W. (2015). *International organizations: The politics and processes of global governance* (3rd ed.). Lynne Rienner.

Kaviraj, S. (2014). The imaginary institution of India. *Occasional Paper*, *5*, 41–64. https://ojs.ruc.dk/index.php/ocpa/article/view/3947

Keller, W. W., & Samuels, R. J. (2003). *Crisis and innovation in Asian technology*. Cambridge University Press.

Kennedy, A. B. (2013). China's search for renewable energy. *Asian Survey*, *53*(5), 909–930. https://doi.org/10.1525/as.2013.53.5.909

Koo, M. G. (2010). *Island disputes and maritime regime building in East Asia: Between a rock and a hard Place (The political economy of the Asia Pacific)*. Springer.

Lee, H., Chan, S., & Oh, S. (2009). China's ICT standards policy after the WTO accession: Techno-national versus techno-globalism. *Info*, *11*(1), 9–18. https://doi.org/10.1108/14636690910932966

Li, C. (1994, July). *The Yin and Yand of East Asia: Part III – techno-nationalism vs. techno-globalism: East Asia in search of a new vision for the 21st century*.

Institute of Current World Affairs. http://www.icwa.org/wp-content/uploads/2015/09/CL-12.pdf

List, G. F. (1986). *Sistema nacional de economia política* [National system of political economy]. Nova Cultural.

Macpherson, W. J. (1995). *The economic development of Japan 1868–1941*. Cambridge University Press.

Mainichi Japan. (2017, September 12). *5 years after nationalizing Senkakus, Japan still looking for solutions with China*. The Mainichi. https://mainichi.jp/english/articles/20170912/p2a/00m/0na/028000c

Maitlis, E. [BBC Newsnight]. (2018, October 15). *Francis Fukuyama on the rise of identity politics* [Video]. YouTube. https://www.youtube.com/watch?v=P1_HNcSpBNs

March, J. G., & Olsen, J. P. (2011). The logic of appropriateness. *Oxford Handbooks Online*. https://doi.org/10.1093/oxfordhb/9780199604456.013.0024

Mazzucato, M. (2013). *The entrepreneurial state: Debunking public vs. private sector myths* (1st ed.). Anthem Press.

Meissner, W. (2003). Collective identity and nationalism in Europe and China. In T. Fisac & L. Fernandez- Stembridge (Eds.), *China today: Economic reforms, social cohesion and collective identities* (pp. 192–221). Routledge.

Micklethwait, J. [Bloomberg Politics]. (2018, October 11). *Steve Bannon on populism, China, Kavanaugh* [Video]. YouTube. https://www.youtube.com/watch?v=Idpxb_Gp3GI

Ministry of Foreign Affairs, Japan. (2016, February 1). *Overview of ODA to China*. https://www.mofa.go.jp/policy/oda/region/e_asia/china/index.html

Ministry of Foreign Affairs, Japan. (2020, December 2). *Free Trade Agreement (FTA) / Economic Partnership Agreement (EPA) and related initiatives*. https://www.mofa.go.jp/policy/economy/fta/index.html

Montresor, S. (2001). Techno-globalism, techno-nationalism and technological systems: Organizing the evidence. *Technovation*, *21*(7), 399–412. https://doi.org/10.1016/s0166-4972(00)00061-4

Moore, C. H. (1917). The decay of nationalism under the Roman empire. *Transactions and Proceedings of the American Philological Association*, *48*, 27–36. https://doi.org/10.2307/282779

Nakayama, S. (2012). Techno-Nationalism versus techno-globalism. *East Asian Science, Technology and Society: An International Journal*, *6*(1), 9–15. https://doi.org/10.1215/18752160-1504708

Nowotny, T. (2012). *Diplomacy and global governance: The diplomatic service in an age of worldwide interdependence*. Routledge.

OECD & Eurostat. (2018). *Oslo manual 2018: Guidelines for collecting, reporting and using data on innovation* (4th ed.). OECD Publishing.

Ohmae, K. (1990). *The borderless world: Power and strategy in the interlinked economy*. Harper Business.

Ohmae, K. (2005). *The next global stage: Challenges and opportunities in our borderless world*. Wharton School Publishing.

Ostry, S., & Nelson, R. R. (1995). *Techno-Nationalism and techno-globalism: Conflict and cooperation*. Brookings Institution Press.

Pamplona, M. A. V., & Doyle, D. H. (2008). *Nacionalismo no novo mundo: A formação dos Estados-Nação no século XIX* [Nationalism in the new world: The formation of nation-states in the 20th century]. Record.

Pilger, C. (2011). *Standing up: An assessment of modern Chinese nationalism's role and impact within China and beyond* [Master thesis, Georgetown University]. Digital Georgetown. http://hdl.handle.net/10822/558090

Reilly, J. (2013). A wave to worry about? Public opinion, foreign policy and China's anti-Japan protests. *Journal of Contemporary China*, *23*(86), 197–215. https://doi.org/10.1080/10670564.2013.832519

Rose, C. [CBS News]. (2017, October 24). *FULL Steve Bannon interview with Charlie Rose on 60 Minutes* [Video]. YouTube. https://www.youtube.com/watch?v=mtpH771t9Nk&ab_channel=RobertHollander

Ryall, J., & Moore, M. (2012, August 19). *Anti-Japan protests erupt in China following island demonstration*. The Telegraph.

https://www.telegraph.co.uk/news/worldnews/asia/japan/9485798/Anti-Japan-protests-erupt-in-China-following-island-demonstration.html

Samuels, R. J. (1994). *Rich nation, strong army: National security and the technological transformation of Japan*. Cornell University Press.

Schoen, J. W. (2018, October 1). *Here are some key differences between Trump's new trade deal and NAFTA*. CNBC. https://www.cnbc.com/2018/10/01/new-trump-trade-deal-leaves-nafta-largely-intact.html

Schwalbe, S. (2018, August 22). *Surveys find outsourcing continues to grow under Trump administration*. American Military University Edge. https://amuedge.com/surveys-find-outsourcing-continues-to-grow-under-trump-administration/

Scobell, A., Burke, E. J., Cooper, C. A., Lilly, S., Ohlandt, C. J. R., Warner, E., & Williams, J. D. (2020). *China's grand strategy: Trends, trajectories, and long-term competition*. RAND Corporation.

Smith, A. D. (1991). *National identity*. University of Nevada Press.

Smith, A. D. (1995). *Nations and nationalism in a global era*. Polity.

State Council of China (2001, May). *Report on the outline of the tenth five-year plan (2001–2006) for national economic and social development*. http://www.npc.gov.cn/zgrdw/englishnpc/Special_11_5/2010-03/03/content_1690620.htm

State Council of China. (2006). *The national medium- and long-term program for science and technology development (2006- 2020): An outline*. https://www.itu.int/en/ITU-D/Cybersecurity/Documents/National_Strategies_Repository/China_2006.pdf

Stefanović, Z. (2008). Globalization: Theoritical perspectives, impacts and institutional response of the economy. *Economics and Organization*, *5*(3), 263–272.

Sutherland, C. (2011). *Nationalism in the twenty-first century: Challenges and responses*. Palgrave Macmillan.

Teixeira, A. A. (2008). National systems of innovation: A bibliometric appraisal. FEP Working Papers (No. 271). Faculdade de Economia, Universidade do Porto http://wps.fep.up.pt/wps/wp271.pdf

Tyfield, D., & Urry, J. (2009). Cosmopolitan China? Lessons from international collaboration in low-carbon innovation. *The British Journal of Sociology*, *60*(4), 793–812. https://doi.org/10.1111/j.1468-4446.2009.01275.x

VPRO. (2013, November 12). *Benedict Anderson about nationalism - In mijn vaders huis, 1994* [Video]. YouTube. https://www.youtube.com/watch?v=cNJuL-Ewp-A

Wang, H. H. (2017, November 2). *Opinion: Xi Jinping thought combines Mao's totalitarianism and Deng's crony capitalism*. Forbes. https://www.forbes.com/sites/helenwang/2017/10/31/xi-jinping-thought-combining-maos-totalitarianism-and-dengs-crony-capitalism/#3b3ec1437dc4

Wendt, A. (1992). Anarchy is what states make of it: The social construction of power politics. *International Organization*, *46*(2), 391–425. https://doi.org/10.1017/s0020818300027764

Westmore, B. (2014). Policy incentives for private innovation and maximising the returns. *OECD Journal: Economic Studies*, *2013*(1), 121–163. https://doi.org/10.1787/eco_studies-2013-5k3trmjlhxzq

Wohlforth, W. C., Little, R., Kaufman, S. J., Kang, D., Jones, C. A., Tin-Bor Hui, V., Eckstein, A., Deudney, D., & Brenner, W. L. (2007). Testing balance-of-power theory in world history. *European Journal of International Relations*, *13* (2), 155–185. https://doi.org/10.1177/1354066107076951

Xi J. (2018). *Speech at the 19th Academician Conference of the Chinese Academy of Sciences and the 14th Academician Conference of the Chinese Academy of Engineering*. Xi Dada News. Retrieved February 1, 2019 from https://xidada.news/2018/05/speech-by-xi-jinping-at-the-19th-academician-meeting-of-the-chinese-academy-of-sciences-and-the-14th_94

Xiao, R. (2013). Debating China's rise in China. In R. Friedman, K. Oskanian, & R. P. Pardo (Eds.), *After liberalism?* (pp. 215–235). Palgrave Macmillan. https://doi.org/10.1057/9781137303769_12

Xinhua. (2018, May 29). *China Focus: Xi calls for developing China into world science and technology leadee*. Xinhua Net. http://www.xinhuanet.com/english/2018-05/29/c_137213175.htm

Yu, G. (2012). *Dynamics of popular nationalism in China's Japan policy in post-Cold War era* [Doctoral dissertation, University of Birmingham]. UBIRA E Theses. http://etheses.bham.ac.uk/3431/1/Yu12PhD.pdf

Zhang, Y. A. (2014). *From amity to enmity: The breakdown in Sino-Japanese relations* [Master thesis, University of Southern California]. USC Digital Library. http://digitallibrary.usc.edu/digital/collection/p15799coll3/id/417958

Zhao, S. (2000). Chinese nationalism and its international orientations. *Political Science Quarterly*, *115*(1), 1-33. https://doi.org/10.2307/2658031.