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FROM STRATEGIC PARTNER TO SYSTEMIC RIVAL: A NEW ERA FOR EU-CHINA RELATIONS

Master's thesis
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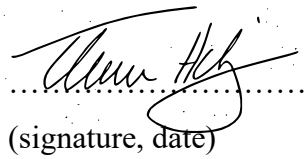
Theresa Halbig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ABSTRACT

The present-day relations between the European Union (EU) and the People's Republic of China (China) do not lack in their complexity. Evidently characterized by reoccurring miscommunication, misunderstandings and misperceptions, this type of inter-relations is additionally strained by Europe's colonial past in Asia. Today, both parties seem to be disillusioned with their joint strategic cooperation, which looked relatively stable in 2013. From the one side, the EU appears as being rattled by a shift in challenges and opportunities presented by China. From the other side, China's rapid rise and massive accumulation of resources, skills, and know-how made it being seen more as a rival rather than a partner. This research operates on the premise, set forward by Structural Realism, that the accumulation of power may be perceived as a threat to other actors in the existing international system (Waltz 1979, 131).

The emphasis is placed on China's accumulation of innovative power gains through the acquisition of technology within the EU. This thesis attempts to explore China's policy in the field of key technologies, the strategies it employs to accumulate these, and the consequences of the country's swift rise as a technological superpower – these factors have seemingly puzzled the EU's foreign policy strategists. Herefore, this work analyzes China's innovation-focused doctrine and its methods of accumulation, while attempring to investigate the depth of the EU's countermeasures and deterrence instruments that deployed by the entity to rebalance its difficult relationship with the Chinese side. These actions are then placed within the Strucutral Realism-bound discussional framework to create a comprehensive understanding of how Foreign Direct Investments, Mergers and Acquisitions, Intellectual Property Rights Infringements, the control of research and development facilities as well as technical standardisation setting contribute to power gains in the XXI century race to technological hegemony. The results not only depict a shift in balance of power, but they also reflect a set of reoccurring themes: the EU's geo-strategic naivity, indecisiveness and defensivelessness.

Keywords: *European Union, China, Strucutral Realism, Innovation, Technology, Power*

List of Abbreviations

AD	Anti-Dumping
AI	Artificial Intelligence
AIIB	Asian Infrastructure Investment Bank
AS	Anti-Subsidy
BMWi	German Ministry for Economic Affairs and Energy
BRI	Belt and Road Initiative
CAI	Comprehensive Agreement of Investment
CCP	Chinese Communist Party
CEEC	Central Eastern European Countries
CEN	European Committee for Standardisation
CNIPA	The National Intellectual Property Administration of the People's Republic of China
CRMs	Critical Raw Minerals
DIN	German Institute for Norms
DOL	U.S. Department of Labour
DSB	WTO Dispute Settlement Body
DSU	WTO Dispute Settlement Understanding
EC	European Commission
ECA	European Court of Auditors
EEAS	European External Action Service
EPO	European Patent Office
ETSI	European Telecommunications Standards Institute
EU	European Union
EUIPO	European Union Intellectual Property Office
FDI	Foreign Direct Investment
FMPRC	The Ministry of Foreign Affairs of the People's Republic of China
FTA	Free Trade Agreement

GDP	Gross Domestic Product
GPA	WTO Agreement on Government Procurements
ICT	Information and Communication Technology
IEC	International Electrotechnical Commission
IP	Intellectual Property
IPR	Intellectual Property Rights
ISO	International Organisation for Standardisation
MoU	Memorandum of Understanding
NATO ENSEC COE	NATO Energy Security Centre of Excellence
NPC	National People's Congress
OECD	Organisation for Economic Cooperation and Development
PRC	People's Republic of China
SC	Subcommittees
SFG	Safeguards
SOE	State-owned Enterprises
SIPO	State Intellectual Property Office of China
R&D	Research and Development
TC	Technical committees
TDI	Trade defence instruments
UN	United Nations
WG	Working Group
WIPO	World Intellectual Property Organization
WTO	World Trade Organisation

INTRODUCTION

Since the establishment of the EU, EU-China relations have not always been an easy cooperation. Geeraerts (2019, 287) notes that diplomatic disputes, political frictions, different interpretations of values and processes have led to turbulence in the process of establishing effective interrelations between the two. Especially, in the last three decades, both sides have changed considerably, be it in politico-economic or geo-strategic terms. The rise of China occurred in an unprecedented manner with a never before seen speed and scope and with special attention on accumulating key technologies. China's rapid gains of strategic technologies have shifted the polarity, as well as our entire global market. President Xi Jinping's emphasis on the accumulation of high-tech capabilities in key-strategic industries at an overwhelming speed suggests that China may be seeking to obtain a leading role not only on an economic level but also on the international stage. From 2012, China has been exerting greater political influence in the EU-bound geo-strategic sphere, supporting individual Member States and other European countries and, evidently, establishing a new system of global governance outside of its geographic 'home' in the Asia-Pacific. For this reason, it is academically legitimate to seek for a deeper understanding of how the accumulation of strategic technologies (capabilities) increases the innovative power and overall power, which China currently exerts globally. The EU's policy paper on China 'EU-China – A strategic outlook' (EC 2019) labels China as a systemic rival for the first time, acknowledging that China has amassed capabilities and, hence, power.

This research paper operates on the premise set out by Structural Realism that the accumulation of power, including technology and innovation as capabilities can be perceived as a threat by other states. Technology as a capability has received comparably little attention in the field of international relations (IR). This research argues that technology may just be the most important capability a country can acquire in the XXI century. Technological innovation generates jobs, creates revenue, increases exports, drives economic growth, as well as international competitiveness. Futhermore, countries that dominate innovation set technical standards. Whoever sets technical standards controls the market as Werner von Siemens noted (Kynge; Liu 2020, 1).

Within the framework of Structural Realism the paper sets out to identify China's policies as either an autonomy- or influence-seeking actor. Therefore, the primary academic standpoints are taken from some of the major sources existing in the field, including Mearsheimer (1995; 2001), Waltz (1979), Giplin (1981), and Nye (1990), in an attempt to explain Neorealist theory, define terms

such as power, influence and capabilities, differenciate between autonomous- and influence-seeking policies, and, eventually, contextualize this theorerical instrimentarium with the topic. In an effort to make a coherent assessment the research analyses key policies put forward in regards to each other, innovation, technology as well as attempts to counter or deter an increasing Chinese threat. Herefore, this research pays attention to "Europe 2020 Strategy" (EC 2010), "the first Horizon Europe Strategic Plan 2021 – 2024" (EC 2021b), "Connecting Europe and Asia – Building blocks for an EU strategy" (EC 2018a), "EU-China 2020 Strategic Agenda for Cooperation" (European Council 2013), "Going Global Strategy" (Tiezzie 2014; Wang T. 2017), "Made in China 2025" (CCP 2015), The Belt and Road Initiatve (NDRC 2015) and most recently "China Standards 2035" (CCP 2020). On the economic level, primary sources are used not only to provide for reliable quantitative data but also to use non-biased information. Thus, the following data bases are used: Trade related data from the The World Bank (2021), Trade Defence tools from the WTO's data base. FDI flow value by the OECD database and EC reports, data on patent applications from the European Patent Office, information on IPR Infringements are compiled and analyzed from the European Union Taxation and Customs Union annual reports, the European Union Intellectual Property Office status report, as well as the World Intellectual Property Organization indicators on IPR. Qualitative secondary sources for analysis include journal articles, publications by European research institutions, the European Commission and working papers. Official statements, public speeches, protocols, minutes, press statements and daily news reports are used when deemed necessary.

Arguably, China, over a relatively short period of time that covers a generation's lifespan, has become a significant competitor of the EU. Therefore, the research places its emphasis on economic relations between the two sides. In particular, it highlights relevant fields through which China has fostered signficant innovation, becoming increasingly competitive. The analytical focus is set on China's methods and tactics of innovation accumulation through trade relations, Foreign Direct Investments, Research and Development, Intellecutal Property and Technical Standardisation. In an effort to make a coherent assessment of the available data, the analysis will include key policies put forward in regards to each other, as well as innovation, technology or attempts to counter and deter an increasing Chinese threat.

How has China gone from a strategic partner to a systemic rival? How has China's accumulation of high-tech capabilities in key strategic industries contributed to this rivalry? How did China accomplish the accumulation of these specific kinds of power gains in the XXI century race to

technological hegemony? What has the EU reaction been to Chinese acquistion strategies? Have the EU's countermeasures been adequate and sufficient to address Chinese strategies?

Testing the claim that China's accumulation of innovative power gains, through the acquisition of technology within the EU, leads to developing a threat-driven attitude towards the most populous country, this dissertation attempts at answering the posed questions commencing with a brief on research methodology, operationalization and the comprehensive data-gathering, as well as the limitations to this research. This is followed by the theoretical background on Structural Realism and what role the acquisition of capabilities plays in advancing one's power position within the international system. The analysis will then attempt to demonstrate the EU's strategy towards China on the entity's political level, singling policies on innovation and technology out. This segment of research is followed by a nuanced observation-based analysis of the EU's activities on economic levels, as well as possible/prospective strategies implemented in an attempt to create a level playing field with China. The paper then goes into determining China's policies, which it has put forth to directly implicate the country's cooperation with the EU, more specifically, to allow for a comparative dimension, China's policies on accumulation of high-tech capabilities in key industries. This is followed by a chapter on the practical strategies China employs in an attempt to accumulate intangibles, skills and know-how. The Results and Discussion break down the individual sections that have been analyzed and compare them with the actions of the other actor. The discussion on China's influence and power gains is followed by a range of policy options outlined by this research in the form of recommendations, contextualizing those with the EU's prospective engagements with China in the future.

1. Research Methodology

1.1. Case Selection, Objectives and Case Design

The urgency of this dissertation mandates state-of-the-art methodology, which enables a highly nuanced observation in the policy-making field. Comprehensive and the most current data-gathering is imperative to identify emerging trends and research relevance and priorities. The case selection is based on the high relevance of EU-China relations with the EU and China being two of the three largest economies and traders in the world today (Christiansen 2016, 39). The future implications of this cooperation will not only impact our economic future but also leave a mark on our understanding of global governance. As noted in the introduction, China appears to not only be intersted in a dominate economic role but is also positioning itself as a leading political power to be taken seriously. China's rapid gains of strategic technologies have shifted the polarity, as well as our entire global market. For this reason it is necessary to create a deeper understanding of how the accumulation of strategic technologies (capabilities) increases the innovative power and overall power China exerts globally.

This research paper operates on the premise that the accumulation of power, including technology and innovation as capabilities, can be perceived as a rivalry and not as a partnership. Technology as a capability has received comparably little and, by far, less nuanced attention in the field of IR, if compared to classic trade, militarization, or public diplomacy practices. This research addresses the aforementioned gap and argues that technology may just be the most important capability a country, let alone a major or super-power, can aquire in the XXI century. Technological innovation generates jobs, creates revenue, increases exports, drives economic growth as well as international competitiveness. Futhermore, countries that dominate innovation set technical standards. Whoever sets technical standards controls the market as Werner von Siemens once said (Kynge; Liu 2020, 1). This research attempts at creating a deeper understanding of innovations contribution to political power gains. Since a conclusion of a state's general power can be drawn when assessing the various capabilities a state possesses, this paper attempts to measure China's and the EU's gains in the capability technology and innovation.

China, over a short period of time, has become a significant competitor of the EU. Therefore the research places its emphasis on economic relations between China and the EU. In particular, this research highlights relevant fields through which China has fostered signficant innovation, becoming increasingly competitive. The author analyzes China's methods and tactics of innovation accumulation through trade relations, Foreign Direct Investments, Research and Development, Intellecutal Property and Technical Standardisation. In an effort to make a coherent assesment the analysis will include key policies put forward in regards to each other as well as innovation, technology or attempts to counter and deter an increasing Chinese threat.

When the EU speaks of the dictonomy of strategic partner and systemic rival they assess, that the level of threat posed by China has increased on various levels (EC 2019). Therefore, the author choose to place their relationship of the past ten years within the framework of Neorealism. The author choose against Classic Realism, due to it's lack of focous on geopolitical aspects and the wider definition of power. The majority of times capabilities within in Classic Realism are defined as solely Military Power and Ressources. This lense seems to be inadequate for their relationship and this current time. Futhermore, the author is aware of the fast, that while China has overwhelming military capbabilities the EU on the other hand lacks hardpower entirely. Therefore an adequate research through the lense of classic realism is not satisfactory. Neorealism allows to look at their relationship complexity and the development from China as a partnern to China as threat, that has accumulated technological capabilities. Although the relationship also has aspects of Neo-Liberalism, Institutionalism and Path Dependency they lack to capture the development of China to be perceived as a rival and do not emphasise the acquisition of capabilites as a shift in power.

This research defines the time-frame to be analysed starting from 2010 and concluding by March 2021 in an attempt to be able to include the most recent policy measures undertaken by the EU in respect to China-originated investments. The EU is an economic and political union of 27 European countries, which, while partly into a number of supranational arrangements, remain sovereign states with their own foreign policies. The paper defines the EU as just such, if not otherwise stated. Nevertheless, the duality of the Member States' identity is crucial to understanding China's approach to the European Union as well. China is defined as the People's Republic of China – excluding Hong Kong and Macao, if not otherwise mentioned.

1.2. Operationalisation

In an effort to understand how China in the perspective of the EU went from a strategic partner to a systemic rival in the field of innovation and technology the author based the definition of innvovation on the OECD (2018) explanation. In accordance with the OECD's (2018) definition of innovation which understands a country's capability to produce technology to go beyond R&D (Research and Development) and nowadays includes intangible goods such as Intellectual Property (IP), standard setting, patent applications and the capacity to produce new technologies in key strategic industries (Kwock *et. al.* 2018, 5). Therefore, this dissertation opts to measure these indicators in an attempt to assess a set of developments within the dictonomy accordingly. This research is based on the outline of a previous study by Garcia-Herrero *et. al.* (2020) for the Policy Department for External Relations of the EU. Therefore, the same paramaters as in the EU Policy Paper are being applied here in an attempt to understand how the dictonomy developed from the perspective of the EU. Thus, this paper uses the same parameters (Trade, Export, FDI, M&A, R&D, IPR and Technical Standardisation) and compiles data from neutral mulitlateral institutions as well. This research will compare the EU's and China's policy efforts to increase technological capabilities, as well as their incentives on an economical level to acquire these capabilites, and their methods to deter and counteract their competition. The results from all fields (Trade, Export, FDI, M&A, R&D, IPR and Technical Standarisation) are compared and set within the framework of Structural Realism. This paper then examines and evaluates China's policy as being either an autonomous- or influence-seeking actor as well as evaluates the EU's attempts to cooperate with China. Based on this assessment, possible/prospective EU-originated policy options on maintaining inter-relations with a major power that has become increasingly aggressive and offensive in its foreign policy are presented.

1.3. Limitations

This study aims to provide an overview of tactics employed by China in an effort to acquire technological capabilities and increase its power position within the international system. Therefore this research compiles quantitative data on Foreign Direct Investments (FDI), Mergers and Acquisitions (M&A), Research and Development (R&D) and Intellectual Property Rights (IPR). It is however essential to be aware of the data's shortcomings. There is no systematic recording of international capital and financial flows. FDI data is compiled by means of analyzing company reports and announcements at the end of each year, meaning FDI flows can highly

fluctuate throughout the year and are not recorded. Although Member States are advised to inform the Commission on FDI and mergers and acquisitions by non-EU countries, it remains within the member states' capacity to do so. Although the EU compiles data on M&A by China, full transparency is difficult to obtain. In some cases the identity of the investor remains unknown, attributing to the uncertainty of the Chinese Communist Party's (CCP) political reach within EU companies (Hellström 2016, 8f.). In the field of R&D and the output of Intellectual Property the available data is limited. Another problem which presents itself with IP data is the costly aspect of tracking IPR infringements. It is within the capacity and prioritisation of each Member State and its respective companies to track and report IPR infringements, therefore the data may be incomplete. The theft of intangibles may go unnoticed and is possibly reported at a later date (EUIOP 2020a, 28). Although on a policy level R&D is identified as a key interest, it remains unclear as to how large the scope of subsidies by the Chinese government is and how the output of Intellectual Property in form of patents compares to the quality of European ones.

The analysis of Chinese acquisition tactics of key technologies is further complicated by the lack of information concerning the involvement of the Chinese state in private Chinese enterprises. Although we differentiate between State-owned enterprises and private entities the CCP has increased its influence within private firms, having established a CCP group within almost every private company by 2018 (Grünberg 2021, 1). Unfortunately, many other fields of interest could not be analyzed within the scope of this paper for example: Human rights issues, Tibet, Taiwan, Hong Kong, outer space, the Balkans, the MENA region and the Indo-Pacific. Additionally, these topics have also either not been addressed by the EU or inadequately. As it is demonstrated throughout the paper, the EU lacks a cohesive strategy and within this topic has only recently become an active player in terms of responding to or being proactive on China. The EU's former 'quietness' poses a concern that spreads across an array of issues.

In an effort to limit the bias towards either party, both Chinese and European primary and secondary literature as well as sources by multilateral institutions that both parties adhere to were used. Only German and English were used due to lanague restrictions. Therefore, only translation of Chinese sources were available. The predominant sources choosen were therefore compiled by Anglosaxon researchers and research institutions located in the western hemisphere. Nevertheless, the amount of American literature was puposely limited due to their predispositioned bias and heavy realist perspective on China. Data by the EU is examined to determine China's status as a potional threat and rival to the EU. When possible this data was compared with information made

available by other institutions, for example the World Intellecutal Property Organization. This allows not only a comparison of the figures but also identifies whether that data matched the European numbers.

2. Contextualising Theoretical Background

2.1. Security and Power in Structural Realism

Security is defined as the state's ability to "maintain their independent identity and their functional integrity" (Buzan 1991 in Bauman *et. al.* 2000, 5). Although, from a neorealist point of view, full security for a state can never be achieved because the international system itself is anarchical. Therefore, states must "strive to preserve and increase their own security" (*Ibid.,* 5) by acquiring capabilities in an anarchic system in which resources are constantly scare. If other states jeopardize a state's security, it will likely attempt to gain as much influence as possible over that environment" (Gilpin 1981 in Baumann *et. al* 2000, 5). Although often equated, this research differentiates between security and autonomy as "[a]utonomy is understood *de facto,* rather than simply formal, independence from other actors" (*Ibid.,* 5). Autonomy therefore, is the state's ability to not have their actions restricted by other states and international organisations, thus making it an autonomous actor. Giplin (*Ibid.,* 5) describes this as "the less control other states have over a state, i.e. the greater its autonomy, the safer that state will be" (*Ibid.,* 5). In an effort to remain independent from other actors, who are only out for their own gains, states must pursue self-help strategies. In an attempt to be self-reliant states must acquire as many resources (capabilities) as possible. To acquire additional capabilities states must compete amongst another, which Neorealists describe as the "struggle for power" (Zakaria 1992 in Baumann *et. al.* 2000, 5). Zakaraia (*Ibid.,* 5). understands this to be both a struggle for "preservation or extension of the state's own power position in the international system as well as the control over other states and the results of international political interactions" (*Ibid.,* 5).

Waltz (1979) uses the term power interchangeably with world influence: "one hand that power allows a state to secure its own independence and to create a greater margin of security *vis-à-vis* other states (Waltz 1979, 194) and, on the other, that states only struggle for power once they have

guaranteed themselves a basic modicum of security (*Ibid.,* 126). Waltz thus assumes on the one hand that power serves a state's own security (and that, as security maximizers, states are thus power maximizers) and, on the other, that power and security are two competing resources between which there can be a trade-off. This is because he uses 'power' in the one case to mean control over resources and in the other to mean 'influence' (control over actors and outcomes)" (Baumann *et. al.* 2000, 5f.). In an effort to create a deeper understanding of China's strategies this paper will differentiate between power and influence. Power is defined as a state's ability to "assert one's own interest in the international system and is based on the possession of means or resources (capabilities) suitable for that purpose" (*Ibid.,* 5). The power of a state results in not only the capabilities it is able to accumulate, but on how its own capabilities equate to the capabilities of other states. Influence is defined as "the means of control a state has over its own environment" as well as its control over actors and outcomes. A state that has high levels of influence can influence actors to produce favourable outcomes. A state's power, and with that the control over resources, can increase when it has a strong influence on the actions of other actors. In fact, it can increase its accumulation of capabilities through influencing the decisions of other states to suit its purpose. Baumann *et. al.* (2000, 5f.) states, that "the greater a state's influence on its environment, the more effectively it can also pursue its non-security interest. Beyond its struggle for security, therefore, every state is also interested in transforming its capabilities into influence" (*Ibid.,* 5). Baumann *et. al.* (2000, 7) concludes that "the stronger a state's power position, the more its foreign policy will strive for autonomy and influence; in other words, it will therefore pursue more policies aimed at maximizing autonomy and influence (= power politics)".

2.2. Forms of Power Politics: Autonomy- and Influence-Seeking Policies

Autonomy and influence may be reflected in the foreign policy a country pursues: "Autonomy-seeking policy serves to preserve or reinforce a state's independence of other states" (Baumann *et. al.* 2000, 8) and can be reflected in a number of behaviors. An autonomy-preserving or -increasing actor will opt to non-comply with existing obligations resulting from bilateral or multilateral international agreements and will refuse to accept new obligations of this nature. Furthermore, autonomy-seeking states will refuse to transfer national material resources to international or supranational institutions or will attempt to win these resources back. Moreover, the state will refuse to transfer any national decision-making power to international or supranational institutions or will attempt to win these powers back. A state may also form an alliance against a threatening

third state, while simultaneously refusing to accept any form of cooperation which creates or reinforces interdependence and may as well create a disadvantage for oneself (*Ibid.,* 9). Although it may appear that the formation and maintenance of an alliance runs counterintuitively to the policy of a country that strives for independence from other states, it may also benefit its own interest. Therefore, according to neorealist alliance theory, "states accept the minimum loss of autonomy necessary for the alliance in order to prevent the threat of a far greater loss of autonomy otherwise involved in dominance by a powerful third country" (*Ibid.,* 9).

While states employ autonomy-seeking policy to elude the influence of their environment, influence-seeking policy is the state's attempt to exercise influence on their environment (*Ibid.*, 9f.). Influence-seeking states will attempt to maximize their voice-opportunities in international organisations by increasing their own share in intra-organisational resources (personnel, voting rights, etc.). Furthermore, the state will preference those multilateral institutions over others, in which it has obtained the most voice-opportunities. The state will then pursue securing additional voice-opportunities, particularly ones regarding the policies on powerful states and groups of states. Additionally, the influence-seeking actor will establish, maintain or reinforce the dependencies of weaker states on it (*Ibid.,* 10). While small states are too weak to pursue neither an autonomy-seeking nor an influence-seeking policy, the greater a state's power position is, the more their foreign policy will be characterized by both of these forms of power politics (Waltz 1979, 194).

2.3. A State's Power Position and Capabilities

Neorealism distinguishes between two approaches to increase one's power position, gain autonomy and influence: There are offensive and defensive approaches: "Offensive neorealists hold that all states must strive for as much power as possible, given the competitive character of the anarchic international system" (Mearsheimer 1995, 11). However, defensive neorealists conclude that since the system is anarchic, states will wish to preserve their power position (Waltz 1979, 198). In an attempt to determine the power position a state holds within the international system it is important to assess its share in resources available in the system in comparison to the resources other actors have accumulated. "In the neorealist view, power is based on the availability of political, economic and military capabilities, which allow a state to assert its own interests in dealings with other actors" (Waltz 1979, 131). A conclusion of a state's general power can be

drawn when assessing the various capabilities a state possesses. “In the neorealist view, then, power is a general potential which a state can employ in quite disparate areas of policy in order to pursue its own aims” (Baumann *et. al.* 2000, 7). Although power is a central theme within neorealism, no author has satisfactorily depicted as to what capability has to be regarded as a significant capability and how this should be measured (*Ibid.,* 7).

Morgenthau (1948) defined eight central elements of national power: geography, natural resources (foodstuffs, minerals), industrial capacity, military preparedness (technology, leadership, quantity and quality of armed forces), population, national character, national morale, quality of diplomacy. Waltz identifies seven different capabilities: size of population and territory, resource endowment, economic capability, military strength, political stability, competence (Waltz 1979, 131). “Neither he nor any other neorealist explicates or operationalizes these terms, let alone brings them together in a coherent and consistent construct” (Baumann *et. al*. 2000, 7). Although Mearsheimer (1995) places a significance of military power, he also fails to provide any clarification on operationalization. Furthermore, Mearsheimer writes, that if the United States and China continue to engage in an intense security competition it is likely to result in an open war. China over the last decade has continuously modernized its military technology and accumulated new military capabilities. It is building military forces that have significant power projection capability. Although intentions by the Chinese government remain unclear, their significant offensive capabilities pose a threat to its neighboring countries. Mearsheimer (2010) argues, that China will not rise peacefully, although it is not clear if China seeks to be a revisionist state or a *status quo* power (Mearsheimer 2010, 385f). For Gilpin, power is based on a state's military, economic and technical capabilities (Gilpin 1981, 13). He stresses the importance of prestige, which he defines as the public morale and the quality of political leadership (*Ibid.,* 13, 30). Joseph Nye distinguishes between hard and soft power (Nye 1990, 31f.), with hard power capabilities being regarded as population, territory and economic and military power. Soft power includes ideas and values, changeable preferences and inter-subjectively marked conceptions (Baumann *et. al.* 2000, 7).

Although all these authors include technology within their assessments, the premise, that technological development and innovative gains equate to power gains and increase one’s power position within the international system, has received comparably little attention within IR. Innovation as a resource that accumulates political power has been a subject within economic research. Economic growth theory argues, that new technologies and ideas can increase returns, create job opportunities and foster long-term economic growth, productivity and innovation (Bhidé

2008 in Kwok *et. al.* 2018, 4f.). “Given the non-zero-sum nature of ideas, greater innovation can lead to more productive and faster growth. Economic policy can promote this significantly by nurturing an efficient science and technology and innovation ecosystem, thus facilitating endogenous innovation and technological development” (*Ibid.,* 4). While the framework for innovation can be set on political level “a diverse range of actors (universities, science institutes, large corporations, small and medium-sized enterprises, startups, etc.) with different strengths contribute to a strong innovation ecosystem within a country” (*Ibid.,* 4f.). The OECD (2018) notes that innovation goes far beyond R&D (Research and Development) and nowadays includes intangible goods such as Intellectual Property (IP), standard setting, patent applications and the capacity to produce new technologies (Kwock *et. al.* 2018, 5).

The more innovative technology a country produces, the more revenue they accumulate, the more goods they can export and the more their GDP will increase. High-tech and innovation have received relatively little attention by IR scholars, which is why this research paper attempts to explore the role of high-tech as a capability in the means to accumulate power and increase one’s power position in the international system. Furthermore, this paper will demonstrate that purchasing, accumulating and developing key technologies is the most vital capability in the 21st century. The aspect of polarity of the international system receives less attention in this paper. For an adequate assessment of polarity, the research would have to include the United States in its assessment as well. Nevertheless, it can be concluded, that the accumulation of capabilities and with that the advancement in a state’s position of power, contribute to a change in polarity, threatening the security of other actors as well as challenging the existing hegemon (Waltz 1979, 131).

3. Empirical Analysis

3.1. The Institutionalisation of Bilateral Relations: A Policy Framework

Diplomatic relations were established between China and the EU's predecessor (European Economic Community) on 6 May 1975, after the visit of the then Vice-President of the European Commission Sir Christopher Soames (Griese 2006, 544). However, the newly estlablished relationship was immediately put on hold only one year later due to the domestic turbulences the death of Mao Zedong entailed. Nevertheless, economic relations continued to prosper resulting in the PRC and the EU signing an agreement on trade and ecomic cooperation in 1985, creating the first common framework for cooperation in industry, mining, energy, transport, communication and technology (Griese 2006, 545). Even though apparent obstacles for closer relations, such as the repression of pro-democracy demonstrations followed by EU sanctions and the Asia financial crisis in 1997/98, bilateral relations consistently intensified in frequency and scope. The first EU-China Summit was held on 2 April 1998 and was followed by an array of many firsts in various fields of policy (*Appendix 1*). China's accession to the WTO in 2001 was strongly supported by the European Union and laid the foundation for the further deepening of these relations (Christiansen 2016, 38). In 2003 bilateral relations became highly institutionalised through the establishment of the Strategic Partnership between the EU and China (European Council 2013). Although recent bilateral disputes and diplomatic frictions have severely strained the EU-China relations, frequent cooperation and communication have partially demonstrated resilience to these adversaries. This resilience can be contibuted to the high degree of institutionalisation of the the EU-China strategic partnership which is reflected in the "extensive web of bilateral dialogues" (Geeraerts 2019, 287). The cooperation between the EU and China is reinforced through annual summit meetings attended on the European side by the President of the European Council and the President of the European Commission and by the Chinese Prime Minister on the PRC's side (Christiansen 2016, 39).

Following the meeting the attending parties release Joint Summit Statements which further contribute to the bilateral framework. Meetings alternate in terms of their location between

Brussels and Beijing and are accompanied by a whole architerure of dialogues offering a platform for disscussion and collaboration in an array of fields (see *Figure 1*).

The "dialogue architecture" (EEAS 2015) (*Appendix 35*) is built on three pillars: political relations, economic relations and "people-to-people" dialogues. "Some of these dialogues have a certain regularity, whereas others only meet occasionally. In any case, the dialogue architecture provides the forum in which Chinese and EU officials can discuss a multitiude of issues, both of a bilateral nature and in preparation for multilateral nature" (Christiansen 2016, 39). In 2013 the agreement "EU-China 2020 Strategic Agenda for Cooperation" (European Council 2013) between the two parties increased their institutionalisation by adding further areas to the common policy dialogue: peace and security, prosperity, sustainable development and people-people contacts. Although the agreement is vaguely worded and attempts to cover an even wider scope of topics, "it signifies that both sides are willing to go further down the road of an institutionalised relationship – a sign that an element of path-dependency is at play here" (Christiansen 2016, 39). It can be deducted that the dialogue architecture provides a stable and continuous framework. Both sides are obliged to meet regularly, creating a routine around meetings which involve increasing administration, agenda-setting and accountability.

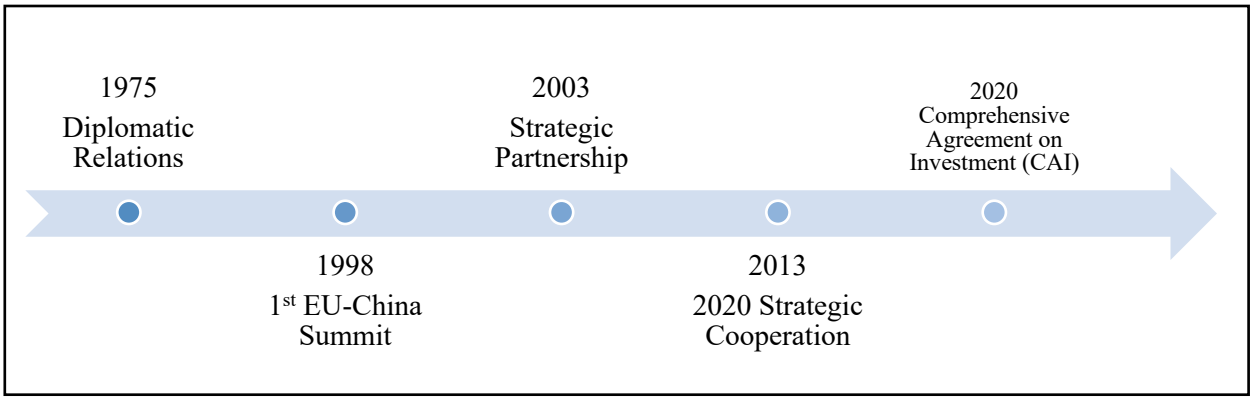

Figure 1 Bilateral Cooperation: Timeline of Highlights
(Source: European External Action Service 2015; EC 2020f), author's depiction

Science, technology and innovation alike have been fields of cooperation within the framework of the Strategic Cooperation (European Council 2013) as well. Both parties emphazise innovation as a "strategic priority" (Kwok *et. al.* 2018, 3) and stress its importance in creating long-term economic growth, maintaining competitivness as well as in developing sustainable approaches to conquer future challenges. While returns from physical means of production diminish, revenues

from intangible goods, such as ideas, intellectual property and research have gained in importance (*Ibid.,* 3). Although both parties pursue smart, sustainble and inclusive growth through innovation and high-tech, the policy approaches by EU and China differ significantly.

3.2. The European Union's Strategy towards the People's Republic of China

3.2.1. Political level: EU Policy on China and Technological Innovation

The European Union regularly publishes an update on their policy and agenda setting concerning China. Since 1995 the EU has released seven papers directly relating to China and cover fields of potential engagements. In 1995 the European Commission (EC) published its first communication on external political relations with China: "A Long Term Policy for China Europe Relations", which was followed by another three policy papers: "Building a Comprehensive Partnership with China" (1998), "EU Strategy towards China: Implementation of the 1998 Communication and Future Steps for a more Effective EU Policy" (2001), and "A Maturing Partnership: Shared Interest and Challenges in EU-China Relations" (2003) (Griese 2006, 247). Today's EU's policy on engagement with China is defined by the "Elements for a new EU Strategy on China" and "Council Conclusion EU Strategy on China" which were reviewed in the "EU-China Strategic Outlook" in 2019 (EC 2019b). Together these recent documents reflect the premises of EU's policy on China: "promotion of democracy, rule of law, human rights and respect for the UN Charter and international law, with the pursuit for reciprocal benefits in political and economic relations" (Delegation of the EU to China 2016) (*Table 1*).

Table 1. Policy Papers and Communications by the European Commission on China

Year	Title
1995	A Long-Term Policy for China Europe Relations
1998	Building a Comprehensive Partnership with China
2001	EU Strategy towards China: Implementation of the 1998 Communication and Future Steps for a more Effective EU Policy
2003	A Maturing Partnership: Shared Interest and Challenges in EU-China Relations
2006	EU-China: Closer Partner, growing responsibilities
2016	Elements for a new EU strategy on China
2019	EU-China – A strategic outlook

Source: Griese (2006, 247); EC (2017), author's depiction

All these communiques have defined European strategies towards China and emphasised fields of cooperation and engagement. While all these papers may have related directly to China, they lack to address emerging trends, controversial behavior and China's increasing competitive advantage. Although the "EU-China Strategic Outlook" from 2019 (EC 2019b) labels China as a "systemic rival" (EC 2019b) for the very first time, it fails to formulate and promote a coherent policy option to deter and counter Chinese geopolitical investment strategy. Especially, when competing with China in the field of innovation, the EU seems to lack particular policy goals fostering high-technology in key industries. Meanwhile China has repeatedly been very vocal about their innovation policy goals (see Chapter 3.3.1.).

For the first time in 2010, in the aftermath of the financial crisis of 2008/09, the EU formulated substantive policy goals for science, technology and innovation in the document "Europe 2020 Strategy" (EC 2010), urging Member States to undertake substantial transformations to be able to foster innovation and hence, financial gains (*Ibid.,* 3). Within this framework the EC puts forward the goal of an "Innovation Union" to improve access to finance for research and development "to ensure that innovative ideas can be turned into products and services" (*Ibid.,* 3) that may contribute to economic growth and job opportunities. Hence, 3% of the EU's GDP were facilitated to R&D (research and development) purposes (*Ibid.,* 2). With China's rapid accumulation of innovation, the EU for the first time has attempted to make an effort to address China's state driven innovation policy by formulating "The first Horizon Europe Strategic Plan 2021 – 2024" (EC 2021b). The aim is to "commit sizable financial efforts to support the green and digital transformation" (*Ibid.,* 3f.) with a budget of €95.5 billion. This innovation plan places an emphasis on addressing the cause of "multiple vulnerabilites ranging from […] manufacturing to […] supply chains, [as well as] digital technologies" (*Ibid.,* 4). Therefore, the EU will henceforth invest in "areas that are of clear strategic importance for Europe, for example green supply chain components, low-power electronics, advanced computing systems or future networks" (*Ibid.,* 4). Investments will also include key-technology areas relating to "manufacturing, energy, mobility, agriculture and food systems" (*Ibid.,* 4). Funding will be made available to "universities, scientific communities and industry, including small and medium enterprises" (EC 2021b, 5). After having described itself as facing an "innovation emergency" the EU hopes that the Horizon 2020 programme can make up for past underprioritisation of innovation and technology (Kwock *et. al.* 2018, 3).

In 2013 (FMPRC 2013) Xi Jinping announced the Belt and Road Initiatives (BRI). Within his speech he elaborated in detail on China's strategic ambitions, cooperation goals as well as the

implementation method. Since then, China has repeatedly addressed the BRI in various speeches and whitepapers, each time expanding the scope of the project from a mere infrastructure plan to a geopolitical investment instrument (see Chapter 3.3.1.). It was not until 2018 that the EU directly reacted to this infrastructure project by issuing a Joint Communication: "Connecting Europe and Asia – Building blocks for an EU strategy" (EC 2018a). Although all 14 pages of this document do not refer to China even once, it nevertheless is targeted at China's infrastructure project: the BRI. The EU connectivity strategy is a sustainable, comprehensive and rule-based connectivity strategy that seeks to "create an environment for investment, create opportunities for businesses and citizens, who will benefit from growth generated" (EC 2018b, 1). The goal of the Joint Communication is to improve the engagement and connectivity between Europe and Asia by "engaging with partners in Europe's neighborhood, in Asia and beyond" (*Ibid.,* 1). The EU does not prioritize a particular region or a particular sector, deeming them all as valuable. Nevertheless, the EU stresses that engagement is best served "when countries adopt good regulatory frameworks, create better business conditions, follow sensible economic policies and tend towards an open market policy" (*Ibid.,* 1). Respecting international organisations, their rules and obligations is a desirable prerequisite for future engagement: "To work efficiently, connectivity requires internationally agreed practices, rules, conventions and technical standards, supported by international organisations and institutions" (*Ibid.,* 1). Although the EU remains an open market, eager to engage with partners, this communication also highlights the EU's interest in creating a level-playing field based on "fiscally, environmentally, socially and economically sustainable and rule based fair competition resulting in equal opportunities for all. The Joint communication also addresses investment strategies in third countries, calling out unfair trade and investment practices that endanger the economy, urging for a comprehensive and rule-based approach guided by responsibility here as well (EC 2018, 1).

The European Commission increased the European Union's External action budget to €123 billion for the period 2021-2027 which represents a 30% increase compared to the previous period (EC 2018b, 1). Within this framework the EU is currently connecting Europe and Asia actively through different approaches: For example, the EU is implementing a Transportation Infrastructure Plan building 4,800 km of road and rails, six ports and eleven logistic centers across Armenia, Azerbaijan, Belarus, Georgia, Moldova and Ukraine aiming for completion by 2030. The EU is also contributing €70 million to an electricity transmission system in the Middle East and has signed an Air Transport Agreement with the ASEAN countries contributing €7.9 billion to transportation hubs (EC 2018c, 2) (*Appendix* 23).

3.2.2. Economic level: Europe's Economic Engagement with China

Trade

Like no other entity, the European Union is highly interconnected with the world. Although the EU's share of world trade has decreased slightly in recent years, it remains at a high level and represents an important foundation for the EU's growth, competitiveness and employment. Although the EU population accounted for just under six percent of the world's population in 2019 (World Bank 2021b, *Population total)* the EU-28's total exports (in goods) accounted for 30.8% of global exports (including intra-EU trade) followed by China (13.2%), the United States (8.7%) and Germany (7.9%). The same year the EU-28's total imports accounted for 52.7% followed by the United States (13.4%) and China (10.8%) (German Ministry of Economic Affairs and Energy 2020, p. 4). According to the Ministry of German Statistics (2021) EU Exports in 2020 decreased by – 9.1% compared to the year before, while Chinese exports merely decreased by – 0.1% (German Ministry for Statistics 2021, 2). The EU is highly dependent on exports with 36 million jobs in Europe being dependent on exports alone. This figure has increased by two thirds since 2000 (Arto et. al. 2018, 7).

The United States (€384.435 million) remained by far the most important destination for goods exports from the EU in 2019, followed by the UK (€318.099 million), China (€198.290 million), Switzerland and Russia. China remained the EU's leading supplier of goods in 2019 supplying good in value of €361.855 million , followed by the US and the UK (*Appendix 24*) (European Parliament 2020, 1). Out of all manufactured EU exports in 2019 16.1% were high-technology manufactured in the EU which is is a slight increase of 0.6% (2018). In comparison the 18.9% of all U.S. manufactured items were high-technology exports. China, by far, exports the most high-tech, at 30.8% in 2019 (World Bank 2021a, *High-technology exports).* In 2019 China exported the most ICT goods percentage-wise of total goods exported at 26.5%. The EU (5.3%) and the United States (8.7%) can hardly comepte with these numbers (World Bank 2021e, *ICT goods exported*).

In 2019, the EU's GDP accumulated to US$16.605 billion which is more than China (US$11.520 billion) but less than the United States (US$ 18.300 billion) (World Bank 2021d, *GDP current US$*). In terms of annual GDP growth the EU's GDP increased by 1.6% in 2019 compared to 2018. Both China (+ 5.9%) and the United States (+2.2%) were able to obtain a higher GDP growth in 2019 than the EU (World Bank 2021c, *GDP growth).* From the GDP reported in 2019 the United

States spent the most on military, namely 3.4% of GDP, followed by China (1.9%) and the EU (1.4%) (World Bank 2021f, *Military expenditure).*

Foreign Direct Investment (FDI)

The Organisation for Economic Cooperation and Development (OECD) (2021) defines Foreign Direct Investment flows (FDI) as "the value of cross-border transactions related to direct investment during a given period of time, usually a quarter of a year," whereas financial flows "consist of equity transactions, reinvestment of earnings, and intercompany debt transactions" (OECD 2021, 1). The OECD (2021) differentiates between outward flows and inward flows. Outward flows "present transactions that increase the investment that investors in the reporting economy have in enterprises in a foreign economy, such as through purchases of equity or reinvestment of earnings." In contrast, inward flows "represent transactions that increase the investment that foreign investors have in enterprises in the reporting economy" (OECD 2021, 1). "FDI positions (stocks) are the value of investment held at the end of a year, […] whereas FDI transactions (flows) measure the value of investment transactions during the year" (OECD in ECA 2020, 17).

This section places its focus on outward FDI flows from the European Union to China. The PRC, due to its share size and consumer power as well as its improved infrastructure and transportation, especially its port efficiency, has been an attractive market for EU FDI. In the majority of cases EU FDI has entered the market by either greenfield (without acquisitions of local companies) or in form of joint ventures. "The EU's accumulated FDI inflow into China was USD 7.17 billion in 2017, three times greater than US accumulated FDI" (Garcia-Herrero *et al.* 2020, 27). From China's accession into the WTO in 2001 till 2016 the EU FDI trend steadily increased, amounting to USD 8.8 billion EU FDI in 2016. Since then, EU FDI has declined to USD 7.2 billion in 2018 (Garcia-Herrero *et al.* 2020, p. 27f.). In the analysis conducted by the European Court of Auditors (ECA) in 2020 "the EU's response to China's state-driven investment strategy" (ECA 2020) the authors argue that this decrease in EU FDI into mainland China can be attributed to stricter PRC FDI regulations (*Ibid.,* 17). According to the OECD's FDI Regulatory Restrictiveness Index (*Appendix* 16), which measures restrictions on foreign direct investments, China has been tightening it's FDI inflow regulations through increasing foreign equity limitations, screening and approval mechanisms, restrictions on the employment of foreigners as key personnel and operational restictions (*Ibid.,* 17). As Appendix 16 demonstrates, China is less open to investment than the EU, scoring a 0.25 on the Index which indicates, that the PRC is a restrictive actor. In

comparisson, the EU collectively scores below 0.12, with Austria being the most restrictive and Luxemourg the least restrictive EU member state for foreign direct investment (*Ibid.,* 18). Chinese increased restrictivness is confirmed by the Commission's Joint Research Centre (JRC) which reports, that "European firms are forced to engage in joint-ventures with Chinese firms and transfer technology […] the Chinese legal framework and the unequal access to the Chinese market, as well as governement funding places European firms at a disadvantage compared to Chinese firms" (*Ibid.,* 18). As Appendix 17 demonstrates, EU FDIs can not be facilitated for acquisitions. The PRC solely allows Joint ventures and minority only options varying from sector to sector. Every sector is subjected to different restrictions, while the preferred form of investment is minority only. The EU Investment Regime vis-à-vis entails no restrictions as Appendix 17 also reflects (*Ibid.,* 19). In the European Union Chamber of Commerce position paper on China the Chamber raises 14 key conerns, "including access to licenses, complex and lengthy adminsitrative procedures, intellectual property protection, lack of transparency and unclear regulations" (European Union Chamber of Commerce 2018 in Garcia-Herrero *et al.* 2020, 29). Although FDI in Chinese ventures has increased security concerns within the EU, with the theft of Intellectual Property (IP) and the forced transfer of innovations being at the forefront, EU companies themselves remain highly interested in the Chinese market and its ever growing consumer power. Therefore, EU corporations now move their investments through offshore centers, with Hong Kong being the obvious choice for entry into China. "Direct investments into Hong Kong originating from the EU increased from EUR 1.4 billion in 2011 to EUR 19.8 billion in 2017" (*Ibid.,* 28). Between 2010 till 2017 the EU's direct investments into China predominatly went into the manufacturing sector, while investments into the service sector were nearly non-existent. This may pose additional challenges in the future, considering that China is currently underway to transform its economy away from manufacturing to consumption, service and innovation sectors (*Ibid.,* 28).

While EU FDI into China has decreased due to tightening restrictive policies, Chinese FDI into the EU and the acquisition of complete companies by Chinese investors has been massive. While chapter 3.3.2 explores China's state-driven investment strategy in detail, it must be added at this point, that the EU has tried to coutner Chinese investments by implementing restrictions collectively. According to the European Commission (2020d) FDI stocks held by third country investors in the EU accounted for 34%, amounting to €6,441 billion in 2017 with over 16 million direct EU jobs dependent on third country investments (EC 2020d, 1). While third country investors have increased their influence within the EU, currently merely 14 EU Member States (*Appendix 8*) have their own national investment screening mechanisms (EC 2020c, 3). In 2017

the EC established an expert group on FDI screening which provides Member States with a forum for exchanging good practices as well as for discussion of further implementations regarding investment screening regulations (*Ibid.,* 3). In response to increasing investments by third countries within the EU, namely China, the EU has initiated various legislative processes, sucessfully implementing the EU screening mechanism of foreign direct investment in October 2020 (*Appendix 9*). “The Regulation is not about closing markets or restraining activities in the Union. Rather it is about identifying and addressing potential threats to security or public order, which may be caused by foreign investments” (EC 2020d, 1). Although this mechanism is a defensive tool to counter investments by third countries and evaluate their potential security threat to the Union, Executive Vice-President Valdis Dombrovski makes it very clear, this measure is not a protectionist effort, rather a countermeasure: “The EU is and will remain open to foreign investment. But this openness is not unconditional. To respond to today's economic challenges, safeguard key European assets and protect collective security, EU Member States and the Commission need to be working closely together. If we want to achieve an open strategic autonomy, having an efficient EU-wide investment screening cooperation is essential. We are now well equipped for that.” (EC 2020c, 1). While Member States may maintain their national screening mechanisms, the EC urges them to make full use of the FDI screening mechanism, which should benefit intra EU cooperation and address common security concerns created by third country FDI. The EC has announced, that it will provide Member States with an annual evaluation of this tool, threats it has identified and measures that were sucessfully impemented to counteract them (EC 2020d, 1).

To counter Chinese investments the EU has not only been pursuing intra-EU solutions, but has also been negotiating with China directly. In an effort to create a level-playing field the EU and China reached an agreement on bilateral investment guidelines, the “Comprehensive Agreement on Investment” (CAI) on December 30th 2020 (EC 2020f, 1). In terms of market access, the playing field has been heavily distorted, functioning in favor of China for the last decade. The EU was able to negotiate unprecedented market access in various service sectors, the most important one being the the manufacturing sector, which makes up more than half of total EU investments (28% automotive manufactuing and 22% basic material manufacturing). Futhermore, the EU successfully negotiated a “value-based investment relationship underpinned by sustainable development principals” (EC 2020g, 1). This is the first time China has committed to undertake actions in the areas of labour and environment. Futhermore, China has agreed within the CAI to implement the International Labour Organisation (ILO) Convention it has ratified. Both parties

agreed to be subjected to monitorisation of the Agreements' implementation. Moreover, both parties agreed to continue negotiations on investment protection and investment dispute settlements within two years of the CAI. Both von der Leyen and Dombrovskis attribute this agreement as a win for the EU's value-based trade agenda (EC 2020g, 1).

Trade Defence

The EU has been an avid user of trade remedies over the last two decades, especially frequently employing trade defence instruments (TDI) against China – or third countries which China qualifies as one of (*Table 3).* The WTO provides its members with tools to protect themselves against unfair competition: Hereby the most prominent TDIs employed by the EU are antidumping (AD) duties, anti-subsidy (AS) measures and safeguards (SFG) (Garcia-Herrero *et al.* 2020, 19). The goal of these measures is to maintain fair international trade in accordance with WTO policy (Mildner, Kantrup 2020, 1).

The EU defines ADs to be in accordance with the World Trade Organisations (WTO) definition which was defined in the "Agreement on the implementation of Article VI of the General Agreement on Tariffs and Trade 1994" (WTO 1994a, 145). According to this document "a product is to be considered as being dumped, i.e. introduced into the commerce of another country at less than its normal value, if the export price of the product exported from one country to another is less than the comparable price, in the ordinary course of trade, for the like product when destined for consumption in the exporting country" (*Ibid.,* 145). "The Agreement on Subsidies and Countervailing Measures" (WTO 1994b, 229) defines AS measures as actions a government or public body enforces to counter subsidies, which are "financial contribution by a government or any public body within the territory of a Member" (*Ibid.,* 229). These include "a direct or potential transfer of funds (e.g. grants, loans, and equity fusion), […] government revenue abandoned or not collected (e.g. tax credits), a government providing goods and services, apart from infrastructure […] a government purchasing goods and any of these [strategies] done by a private company on the instruction of the government" (*Ibid.,* 229). Financial contributions made by or on behalf of a government or public body give the recipient benefits. Therefore, subsidies can be viewed as coercive strategies that can distort the market and create unfair competition, damaging the industry (EC 2019a, 1). If a complaint is brought forward, that provides sufficient amount of evidence in accordance with EU anti-subsidy investigation, the Commission must open an investigation.

The first two TDIs are designed to counteract unfair trading practices whereas SFG "are designed to temporarily protect the importer from unforeseen, sharp and sudden increases in imports" (Garcia-Herrero *et al.* 2020, 19). Therefore, SFGs are less frequented than AD duties and AS measures. When "a higher level of injury than the material injury required for anti-dumping and anti-subsidies" (EC 2020a, 1) is evident the EU may launch an investigation and implement safeguard measures. Another essential feature of safeguards is that they apply to all such imports from all countries (this is called *erga omnes*), whereas anti-dumping duties and anti-subsidy measures can apply to individual countries, sectors and products (Garcia-Herrero *et al.* 2020, 19).

Table 2. Use of trade defence instruments by the EU

Measures	Objective	EU cases in force (2018)	EU cases in force against China (2018)
Antidumping (AD)	Measures against dumping (i.e. when import prices are set below prices or cost in the exporting country)	120	60
Antisubsidy (AS)	Measures to offset subsidies in exporting countries	12	6
Safeguards (SFG)	Emergency measures to temporarily limit imports to protect local industry	1	1

Source: WTO (2020), (Garcia-Herrero *et al.* 2020, 19), depiction by Garcia-Herrero et al. 2020, 19.

Table 2 summarizes all three Trade Defence instruments (TDI). ADs are by far the most frequented tool by the EU with 120 cases in force in 2018. In comparison, China merely has 60 cases against the EU in force (*Table 2*). AD have a strong effect on trade and can have severe consequences if imposed. In a study conducted by the Policy Department within the Director Generals Office for External Policies of the Union (Garcia-Herrero *et al.* 2020 1 – 70) the authors calculate, that ADs imposed by the EU targeting imports from China reduce quantities up to 84% resulting in Chinese exporting firms exiting the European market (*Ibid.,* 19f.). Therefore, this next section will focus on the EU's usage of ADs targeted at China.

Since the implementation of Trade defence mechanisms in 1995, the EU has been an avid user of trade defence instruments for the past 25 years, regularly reforming and updating their process. As Appendix 34 demonstrates the number of cases initiated against China has significantly increased since the countries accession into the WTO in 2001. The number of cases peaked in 2006 with 12 EU AD initiations against China, while the initiations against China in percentage to total cases

peaked in 2013. Since then, the number of new cases initiated has declined from an average 6.4 cases per year in the decade from 2001 to 2010 to an average of 4.1 cases from 2011 to 2019. In 2019, only two new cases were initiated yet percentage-wise to the total of EU AD cases initiated these two cases equal 40%.

The authors correctly point out, that a decline in the initiations of AD cases by the EU does not necessarily reflect a more liberal EU policy stance towards China. The decline mirrors an overarching EU trend: "The number of total EU AD cases initiated against all countries has roughly halved from an average of 21 per year from 2001 to 2010 to 11 in the years from 2011 to 2019. Relative to this declining trend, the share of EU AD cases initiated against China has even increased […] While around 34% of all EU AD cases launched by the EU targeted China between 2001 and 2010, this share slightly increased to 39% in the period from 2011 to 2019, reaching 40% in 2019" (*Ibid.,* 20). Yet in comparison with other actors, the EU's trade stance towards China appears almost liberal again. During the same time period from 2011 to 2019 India was by far the most frequent user of ADs against China with 9.6 cases per year followed by the U.S (7.6), Brazil (5.9) and Argentina (5) (*Appendix* 14.).

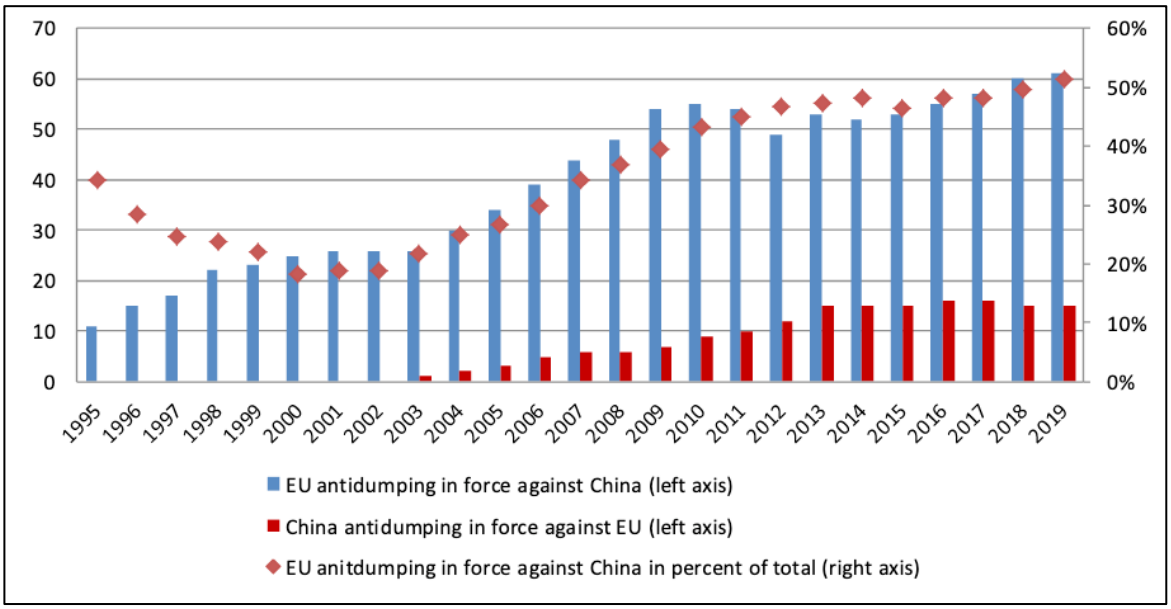

Figure 2. EU AD measures in force against China & Chinese AD in force against the EU (Source: Garcia-Herrero *et al.* 2020, 22)

The number of EU AD measures in force against China has consistently increased since 2003. Figure 2 shows, that in both absolute and relative terms EU AD duties in force against China have

increased - between 2003 (26 cases) and 2010 (55 cases). This rise has since then slowed down to 61 cases being in force by 2019. Nevertheless, China accounts for 51% of all EU AD duties in force by the EU against third parties (*Ibid.,* 22). AD measures in force against China vary tremendously by economic sector. In 2019 the most EU AD measures were imposed in the metal sector (28 cases in force), followed by the chemical and pharmaceutical sector (15 cases in force), and machinery and electrical equipment (5 cases in force).

When compared with other countries, the EU remains a moderate user of AD measures in force against China (*Appendix* 15.). In 2019 the EU was the third largest user of AD measures in force (61) with a significant difference to the first two: The U.S. (124) and India (97). Turkey (63) and Argentina (56) didn't rank far behind the EU. "In total 638 AD measures were in force against China in 2019, constituting around 33% of all AD measures in force worldwide in that year" (Garcia-Herrero *et al.* 2020, 23) (*Appendix* 33). Overall, it can be concluded, that the EU has been consistently deploying Trade Defence Instruments against China over the past two decades. Although the EU, in comparison with other countries, has a rather moderate trade defence policy there have been growing concerns about increasing unfair trade policies and coercive methods.

These growing concerns are reflected in the recent legislative measures, which the EU is in the process of implementing. The new legislation will enable the EU to react without a WTO final ruling being passed and therefor will "empower the EU to protect its trade interest despite the paralysis of the multilateral dispute settlement system in the WTO" (EC 2021a, 1). The EU defines coercive practices to be "practices by non-EU countries that seek to pressure the EU or its member countries into taking or withdrawing particular policy measures" (*Ibid.,* 2). The new legislation will expand the scope of regulations and trade policy measures to include certain trade-related aspects such as intellectual property rights (IPR) and technical standardisation (EC *Ibid,* 1). The initiative will seek to deter the threat of coercion, minimize negative effects caused by coercion practices and develop coordinated strategies to counter these, while simultaneously maintaining an open economy. The instrument is currently still undergoing the legislative process, it is set to be installed no later than the fourth quarter of 2021. In a statement by the Commission Executive Vice President and Commissioner for Trade, Valdis Dombrovskis said, "that the European Union will take action to defend and protect our companies, workers and consumers whenever our partners do not play by the rules. […] we cannot afford being defenceless (*Ibid.,* 3).

Intellectual Property Rights (IPR) and Research and Devleopment (R&D)

Increased investments in Research and Development (R&D) boost the output of Intellectual Property (IP) which, in tangible terms, can be measured in patents. The leading innovative country simultaneously expands its power and influence in the process of international technical standard settings. High government investments in R&D hence result in not only financial net-gains but also in geopolitical influence. Therefore, it is crucial to not only develop IP but to also protect it. This next section will accumulate data on the EU's influence in the area of R&D, IP and technical standardisation, as well as policy measures that have been implemented to protect IP.

Since 2004 the European Commission has annually published the "EU Industrial R&D Investment Scoreboard", which analyses the top investors in R&D worldwide by ranking 2500 companies investing the largest sums in R&D as well as the corresponding sectors they focus their investments on. The 2020 edition (Grasson *et. al.* 2020) reports, that while worldwide investments increased in 2019 for the tenth consecutive year, the EU allocated significantly less funds into R&D than China or the United States did. In 2019 EU based companied increased R&D spending by 5.6%. Simultaneously, Chinese companies increased their spending by four times that amount, investing 21.0% more in R&D than in the previous year (*Ibid.,* 2). Overall R&D spending is highly concentrated within four sectors accounting for 77% of total R&D investments: ICT (Information and Communication Technologies) producers (23%), health industries (20.5%), ICT services (16.9%) and the automotive industry (16.9%). In 2019 EU companies invested €188.9 billion in R&D. In 2019, the EU R&D spending was dominated by the automotive industry with 34.8% followed by the health industries (19.2%) and ICT producers (14.2%) (*Figure 3*). Therefore, the EU's R&D growth is predominantly shaped by the advances within the automotive industry. Whereas China significantly outspends the EU in ICT producers (30.0%) and ICT services (17.5%) especially in the research and development of biotechnology, software and internet (*Ibid.,* 3ff.).

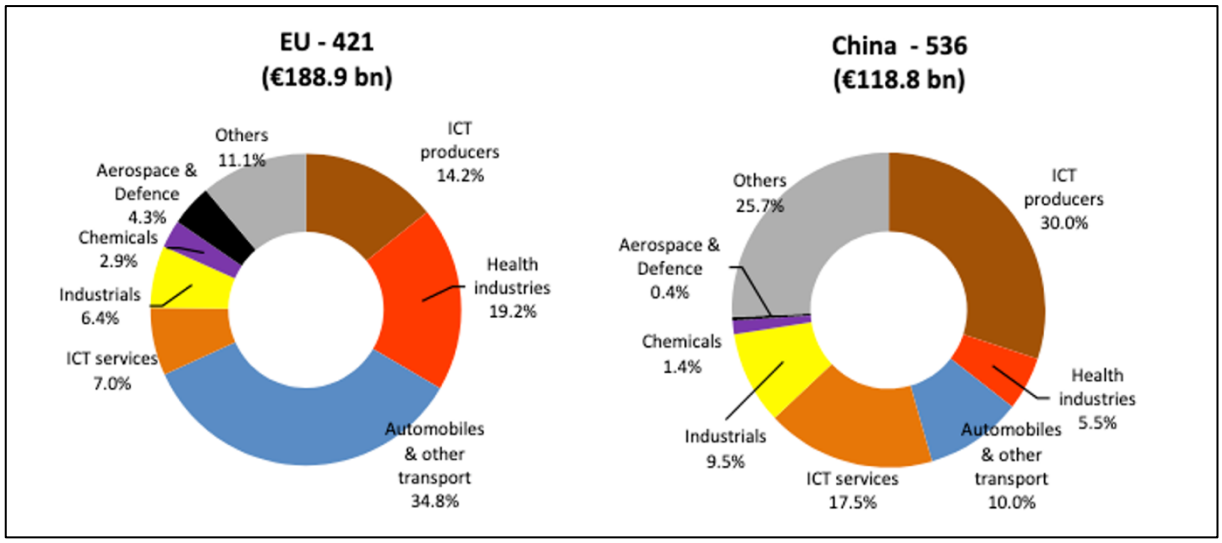

Figure 3. R&D investment in 2019 by region/ country and sector group (EU Industrial R&D Investment Scoreboard by Grasson *et. al.* 2020), depiction by (Grasson *et. al.* 2020, 3).

Investments in R&D and the protection of the intellectual property created in the process are vital. Therefore, IPR protection and enforcement are crucial to the EU's economic growth and innovation capacity to maintain a competitive advantage globally. "According to a joint study by the European Intellectual Property Office (EUIPO) and the European Patent Office (EPO) from September 2019, IPR-intensive industries generated around 84 million or 38.9% of all jobs in the EU during the period 2014 - 2016 (including indirect jobs). Over the same period, IPR-intensive industries accounted for around 45% of the EUGDP, worth some €6.6 trillion annually" (EC 2020b, 4 as seen in EPO; EUIPO 2019, 7ff.) (*Appendix* 31).

According to the publication by EC (2020b) the economic importance of IPR is also "reflected in the contribution of IPR-intensive industries to the EU's external trade. In 2016, taking both goods and services into account, 80% of EU imports and 82% of EU exports were generated by the IPR-intensive industries, which translates into a trade surplus of around € 182 billion" (EC 2020b, 4 as seen in EPO; EUIPO 2019, 7ff.).

Intellectual Property is increasingly gaining in significance in international trade because now more than ever innovation, R&D and IP contribute decisively to the competitiveness of a country. The number of intangibles a company produces has rapidly increased through technological advancement, therefore forced technology transfer has become increasingly worrisome and a very real threat to the European Industry (EC 2020b, 3). Intellectual Property can be made tangible

through filing a patent. This makes it easier to track and annually record violations, theft, copying and other infringement strategies. As Figure 4 "European Patent Applications" depicts, states who are currently members of the European Patent Organisation are paving the way in total patent applications filed with the EPO. From 2011 to 2020 EPO Member States have consistently been far ahead of other applications, filing 45% of applications in 2020, followed by the USA with 25%, Japan with 12% and China with 7% (*Figure 4).* The majority of patents filed by EPO Member States stem from the field of medical technology (14,295 patents), digital communication (14,122 patents) and computer technology (13,097 patents). Out of all EU states Germany filed the most applications in 2020 being 14% followed by France at 7% (EPO 2021, 1). In 2020 the EPO saw a strong increase from patents filed from China with an increase of 9.9%. The leading Chinese firm that had filed the most applications last year in 2020 was Huawei Technologies with 3,113 patents registered (EPO 2021, 1).

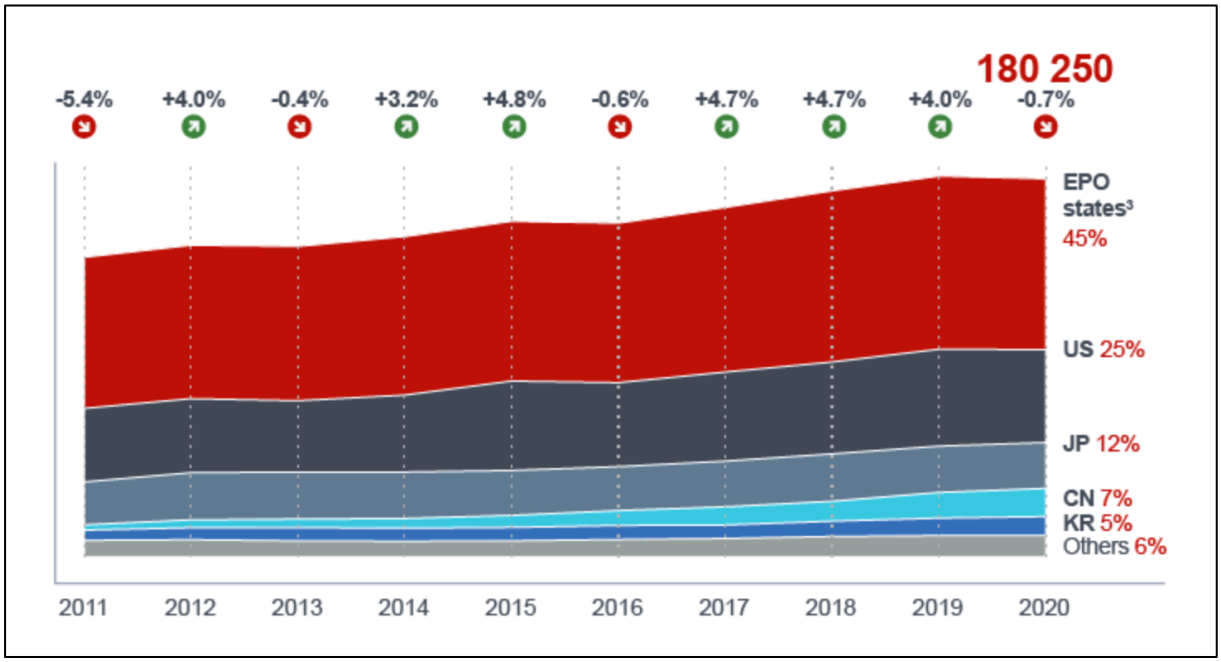

Figure 4. European Patent Applications (Source: Patent Index 2020, European Patent Applications), depiction by EPO 2020, 1.

Intellectual property is directly linked to productivity and prosperity (*Appendix* 31). Therefore, the EU covers legal recognition, registration, utilization and effective adequate enforcement of all forms of IPR in both tangible and intangible forms. Even though the EU has its own set of rules and regulations there nonetheless remain practical challenges and limitations of IP protection of EU companies in third countries: "Third countries may force technology transfer, procedural deficiencies, backlogs in rights registrations, non-registration of certain rights, non-deterrent level

of sanctions, lack of expertise, corruption, lack of awareness, lack of transparency, direct or indirect government coercion" (EC 2020b, 5). These practices threaten EU prosperity and competitiveness in the world market making competition harder with countries that utilize one of these IPR infringement practices to gain advantage over EU competitors and offer the same service or products at dumping prices.

Since 2006 the EC has been publishing an annual "Report on the Protection and Enforcement of Intellectual Property Rights in third countries" (EC 2020b). "The main objective of this report is to identify third countries in which the state of IPR protection and enforcement (both online and offline) gives rise to the greatest level of concern and thereby to establish an updated list of so-called priority countries […] where (such) deficiencies are deemed to cause the greatest economic harm to EU interest" (*Ibid.,* 3). The latest "Report on the Protection and Enforcement of IPR in third countries" (EC 2020b) places as special emphasis on China. The report by the EC cites the never before seen "scale and precedence" (EC 2020b, 7) of issues, labeling them as "systemic problem" (*Ibid.,* 8f.). Especially forced technology transfers, in which Chinese companies' pressure foreign firms to transfer technology to China in exchange for market access, investment access or regulatory approvals, cause "irreparable harm to European businesses" (EC 2020b, 9). These Chinese practices put European operators at risk of losing their competitive edge and business (Zubascu 2020, 1). Therefore, the report rewards China with its own category by placing it at the highest priority. "China continues to be a Priority 1 country for the EU because of the scale and persistence of problems in the area of IPR protection and enforcement. The Commission's "Report on EU Customs Enforcement of IPR" (European Union Taxation and Customs Union 2018) and the EUIPO study 2020 "Status Report on IPR Infringement" (EUIPO 2020a) show that China is at the origin of a dominant share of counterfeit and pirated goods arriving in the EU, in terms of both value and volume. More than 80% of the seizures of counterfeit and pirated goods by EU customs authorities originate from China and Hong Kong" (EC 2020b, 9). The report then addresses, "forced technology transfer is an increasingly important trade irritant" (Ibid., 9).

Since 2008, the EU findings have been annually published in "the Report on EU customs enforcement of IPR" (European Union Taxation and Customs Union 2007 – 2019). The statistics are accumulated by the Commission and based on the data transmitted by Member State administrations (*Appendix* 9).

Table 3 and 4 depict the data compiled by the author from the 2007 – 2018 reports on EU customs enforcement of IPR (European Union Taxation and Customs Union 2007 – 2019), as well as the author's own calculations of Article infringements by China in numbers and the retail value of these infringements in Euros. Both calculations were rounded up when the value was between 5 and 9 after the decimal point and respectively rounded down when the value after the decimal point was between 0 and 4.

Since the first initiative by the Commission, the EU-wide data aggregation regarding IPR infringements in 1999 China has consistently been the leading perpetrator of IPR infringements by articles and retail value, directly followed by Hong Kong every year. In an effort to make an accurate assessment of Chinese IPR infringements the author compiled the publicly available "Reports on EU customs enforcement of IPR" published by the EU Taxation and Customs Union from the years 2007 to 2018 and calculated the number of infringed articles by China as well as their retail value (*Table 3*). Table 3 reflects, that while the number of total articles examined by EU customs may have consistently decreased, the articles percentage-wise infringed by China have increased over a ten-year span. IPR infringements in articles that could be attributed to China peaked in 2010. That year of all the articles confiscated by customs 84.92% were from mainland China, amounting to 87,728,243 articles in total. After a slight decrease in IPR infringements perpetrated by China they peaked again in 2014 (80.08%) and in 2016 (80.65%). IPR infringements committed by China by articles consistently stay above 50% of total articles, with an exception when in 2015 China merely perpetrated 41.08% of all IPR infringements caught at EU borders. While the compiled data depicts a clear trend upward in IPR infringements committed by China in articles, the number of infringed items originating in China has significantly decreased, recently dropping to 13,507,278 articles in 2018. The year 2017 may be a statistic outliner since even the reported total articles confiscated drastically drops from 41,387,132 articles confiscated in 2016 to merely 31,410 articles in 2017. Nevertheless 73.04% of IPR infringements that year can be attributed to China. A possible reason for this outliner may be that IPR measures that year decreased, their controls eased or the reporting by Member States decreased. Tracking and reporting of IPR infringements lies in the responsibility of Member States. In that case that these do not have the necessary resources to confiscate and compile data, the accumulated data may not be an accurate reflection of reality. Overall, it can be observed, that just like the number of total of articles confiscated at EU boarders has decreased, so has the number of Chinese goods. Yet, when examining this trend in percentages it becomes clear that China is a strong perpetrator of IPR infringements consistently producing over 50% of infringed IPR articles caught at the border.

When calculating the mean of an eleven-year span, from 2007 to 2018, 79.02% of IPR Infringements in articles can be attributed to China.

Table 3. Registered IPR Infringements perpetrated by China – by Articles

IPR Infrigments by China - Articles			
Year	**Total Articles**	**Articles by China in % from total articles**	**Articles by China in numbers**
2007	79 076 458	57.92%	45 801 369
2008	178 908 278	54.57%	97 630 247
2009	117 959 928	64.40%	75 966 194
2010	103 306 928	84.92%	87 728 243
2011	114 772 812	72.95%	83 669 380
2012	39 917 445	64.51%	25 750 744
2013	35 940 294	66.12%	23 796 069
2014	35 568 982	80.08%	28 483 641
2015	40 728 675	41.08%	16 731 340
2016	41 387 132	80.65%	33 378 722
2017	31 410	73.04%	22 942
2018	26 720 827	50.55%	13 507 378

Source: European Union Taxation and Customs Union (2007 - 2018). Report on EU customs enforcement of IPR, author's depiction and analysis

While IPR infringements by article have been tracked annually since 2007, their value (EUR) has only been tracked since 2010. Table 5 depicts a similar picture as Table 3 did. Table 4 also demonstrates, that the Total Domestic Retail value (EUR) of registered IPR infringements has consistently decreased, slightly dropping from €1.1 billion in 2010 to €738 million in 2018. In 2018 the retail value of IP infringements accounted for €738 million of which €463 million can be attributed to China. The PRC remains the main perpetrator accounting for consistently more than 58% of retail value of the total domestic retail value (excluding 2017, which again appears to be an anomaly). Although statistics for the year 2019 have not yet been released by the EU, other sources have determined China to be the main perpetrator of IPR infringements once again.

Researchers and EU policy-makers alike predict that through the construction of new transport links such as the growing rail network encompassing the BRI may in fact provide counterfeiters

with an opportunity to diversify their means of transportation, leading to a rapid increase of counterfeits arriving at EU boarders (European Union IP Office 2020, 15). Several requests by major stakeholders have already been put forward to enforce EU customs controls more strictly to avoid the increase in flow of counterfeit goods from China to the EU via land routes. (EC 2020b, 19)

Table 4. Registered IPR Infringements perpetrated by China – by Value

IPR Infrigments by China - Value			
Year	**Domestic Retail Value (EUR)**	**China by value in % from total domestic retail value**	**Retail Value of Chinese IP (EUR)**
2007	Not registered	Not registered	Not registered
2008	Not registered	Not registered	Not registered
2009	Not registered	Not registered	Not registered
2010	1 110 052 402	72.91%	809 339 206
2011	1 272 354 795	70.93%	902 481 256
2012	896 891 786	77.09%	691 413 878
2013	768 227 929	72.43%	556 427 489
2014	617 046 337	66.42%	409 842 177
2015	642 108 323	58.37%	374 798 628
2016	672 899 102	77.21%	519 545 397
2017	582 456 067	37.73%	219 760 674
2018	738 125 867	62.86%	463 985 919

Source: European Union Taxation and Customs Union (2007 - 2018). Report on EU customs enforcement of IPR, author's depiction and analysis

IPR infringements impact the innovation power of a country, the economic output of the EU, the financial future of EU companies, as well as job security for EU employees (EUIPO 2020a, 28). Therefore, combatting IPR infringements committed by third-countries is vital for Europe's future economic success. Yet, combatting IPR infringements is a costly endeavor. IPR infringements are tracked by EU member states individually, respectfully their customs enforcement and protection are dependent on the prioritization of IPR enforcement by the individual state, and hence, the allocation of resources the individual state provides. Yet, before IPR infringements can be tracked and later compiled, an infringement, theft or copy of IP needs to be reported to the authorities by the individual enterprises affected. Overall, the average company within the EU spends EUR

115,317 annually on enforcement-related activities. The cost for small companies (max. 50 employees) was on average EUR 83,653 per year. Medium-sized companies (50-250 employees) allocated EUR 103,166, while large companies (over 250 employees) allocated on average EUR 159,132 per year (EUIOP 2020a, 28). "In terms of cost categories, the annual employee cost […] accounts for 32% of the total cost […] followed by the cost of storage and destruction of seized goods with 21% and external legal assistance cost, 17%" (EUIPO 2020a, 28). The cost of dealing with IPR infringement is burdensome to companies within the EU. In "the Study on Trade Secrets" conducted by the European Union Intellectual Property Office (2020b) twelve EU companies with the majority (69%) having ten years of more experience in dealing with China and 80% having current business ties to China, were surveyed on their experience with IPR infringements, especially those concerning the theft of trade secrets. The results depict a clear picture: 57% have experienced trade secret leakage when an employee leaves the company, 49% have experienced this in other circumstances, 25% have filed administrative complaints, 46% have filed civil proceedings and 34% have filed criminal complaints. 37% surveyed remain concerned about the protection the law provides in case of IPR infringements and trade secret theft. Merely 9% agreed that trade secrets protection had improved in China, 91% were either concerned or neutral about IPR protection in China (EUIOP 2020b, 16).

To combat IPR infringements by China, the EU deployed a set of different tools and mechanisms to support China's efforts to improve IPR protection: The EU seeks out bilateral forums to resolve issues, such as the EU-China IP Dialogue at strategic level which takes place once a year and the EU-China IP Working Group at technical level, organized usually twice a year. Furthermore, the Joint Customs Cooperation Committee, which was established in 2009, is in charge of the "EU-China Customs IPR action plan" (EC; GACC 2012). On a unilateral level the EC has set up a IPR SME Helpdesk in China, to support small and medium sized European enterprises, which seek to protect and enforce their IPR in China (EC 2020b, 21).

Technical Standardisation

Werner von Siemens, the 19th-century German industrialist and innovator who gave his name to the Siemens conglomerate he founded, said: "He who owns the standards, owns the market" (Kynge; Liu 2020, 1). Technical Standardisation is an underestimated and insufficiently researched (Rühlig 2020, 5) field, with which one can wield enormous power by dictating market compliance rules. Being able to set the international standards means other countries must comply

with your order. European countries, along with the USA, did just that back in the 1970s (Fuest 2020, 1). Western companies set the standards for various products and the rest of the world had to comply if their manufacturers wanted to maintain access to the world market (Fuest 2020, 1). "Standard-setting has for decades largely been the preserve of a small group of industrialized democracies. Everything from the width of train tracks, to software, satellites, the frequencies that mobile phones use and a whole gamut of rules about how electronic gadgets work and process data have been decided by western-dominated standards organizations" (Kynge; liu 2020, 1). Dr. Tim Rühlig in his research paper "Technical standardisation, China and the future international order" (2020) writes, that technical standardisation in the past had not been considered a political tool one can exert power and political influence with because it is by its nature, a non-political field. Standards are set by private actors, not states. But in the recent decades this game has changed. The Chinese government has recognized the significance of standard setting and therefore has been the driving force of reforms. The Chinese Government is very actively involved in the quest to acquire control over legislative standardisation bodies. Therefore, the author deems it to be essential to include the recent developments in the field of technical standardisation in this research.

By definition technical standards are "neither laws nor legally-binding state regulations. Instead, technical standards are the result of negotiations among private companies and associations" (Rühlig 2020, 8). In other words, technical standards are the result of voluntary, private self-regulation without any state interference. Although they may be voluntary on paper, they are enormously powerful in practice and noncompliance has severe implications: "Products that do not comply with a standard can hardly be sold on the world markets. […] Technical standards can also become subject to international trade law" (*Ibid.,* 8). Our current international standardisation system is largely shaped by EU member states. Technical standardisation exists at national, European and global level. In the EU national standardisation agencies have joined forces by forming the European Committee for Standardisation (CEN), the European Committee for Electrotechnical Standardisation (CENELEC) and the European Telecommunications Standards Institute (ETSI). The global standardisation organisation, the International Organisation for Standardisation (ISO) and the International Electrotechnical Commission (IEC) are formed by the national standardisation bodies from Europe and the world. Standards are negotiated and agreed upon by highly specialized technical committees (TCs), their subcommittees (SCs) and working groups (WGs). These bodies are composed of technical experts from leading companies in their respective fields (*Ibid.,* 8f.). In the IEC European countries combined hold the most secretariat

positions: Germany holds the most overall (36) followed by France (22), UK (20) and Italy (13) (*Figure 5*) (*Ibid., 22).*

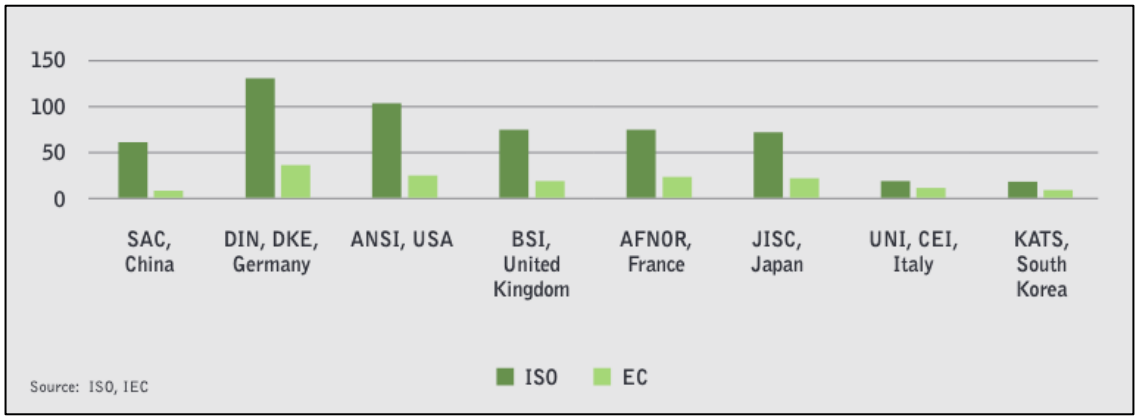

Figure 5. Total of ISO and IEC secretariats, selected countries
(Source: Rühlig 2020, 22), depiction Rühlig (2020, 22).

"For a long time, academics did not consider technical standardisation as a matter of politics or international political order" (*Ibid.,* 8). Globalization critics rightly point out that standardisation has empowered private companies over public authorities. A small group of predominantly western companies wields enormous influence over international standards setting and hence controls the world market. Until recently this power "was hardly perceived as such because technical standardisation was seen through the lenses of private self-regulation, not state power" (*Ibid.,* 8). While European states remain unaware and reserved about this field the Chinese government has been an active force in pushing for changes (see 3.3.2. for details). The awareness of the future implications a shift in standards setting will have are underestimated by the EU. "Over the last 10 to 15 years, [the US and EU] leadership role has eroded and our leverage to establish standards and protocols reflecting our values had diminished […] as a result other, but mostly China, have stepped into the void to advance standards and values that advantage the Chinese communist party" (Kynge; Liu 2020, 1). In an interview with the German newspaper the executive of the German Institute for Norms (DIN) Christoph Winterhalter notes, that "while China proposes nearly half of the new standards, there has been no pushback from the EU or USA" (Fuest 2020, 1).

3.3. China's Strategy towards the European Union

3.3.1. Political level: Chinese Policy on Engagement with the EU and on Technological Innovation

The aim of this chapter is to highlight policy the Chinese Government has put forward which is directed towards the EU or has direct implications for the EU. A special emphasis is placed on polices China has produced in an effort to establish itself as leading country in technological innovation. Unlike the EU, China has a centralized state that has a formal hierarchy in the scope of foreign policy (Christiansen 2016, 37). Although complexity within the Chinese system can be found, scholars have observed, that since Xi Jinping became President, there has been a noticeable centralization of power at the top (Wang 2015). This is also reflected in Chinese foreign policy and bilateral relations with the EU. While previous relations with the EU were "informally allocated to the Prime Minister, Xi Jinping the President himself has assumed responsibility for this relationship – as evidence by the first presidential visit from China to the EU institutions occurring within a year of Xi assuming office" (*Ibid.,* 38). A more centralized leadership has permitted a coherent strategic action and consistent diplomatic agendas.

Table 5. Policy Paper by the People's Republic of China on the European Union

Year	Title
2003	China's EU Policy Paper
2014	China's Policy Paper on the EU: Deepen the China-EU Comprehensive Strategic Partnership for Mutual Benefit and Win-win Cooperation
2018	China's Policy Paper on the European Union

Source: Griese (2006, 247); FMPRC (2020), authors depiction

While the EU lacks a powerful centralized leadership, often sending out mixed messages or no messages at all, China tends to repeat the same message of sovereignty and One China policy. The Ministry of Foreign Affairs of the People's Republic of China (FMPRC) has put forth three policy papers on the European Union to date: The first one in 2003 "China's EU Policy Paper" (FMPRC 2003), the first one under Xi Jinping's leadership "China's Policy Paper on the EU: Deepen the China-EU Comprehensive Strategic Partnership for Mutual Benefit and Win-win Cooperation"

(FMPRC 2014) and the latest one in 2018 “China’s Policy Paper on the European Union” (FMPRC 2018) (*Table 5*).

Going Global Strategy

Already back in 2012 Xi Jinping stressses the importance of technological dominance and introduces the Going Global strategy at the 18th CPC National Congress. Chinese companies are advised to expand overseas at a fast pace, acquire key technologies, enhance their operations and develop multinational cooperations (Wang, T. 2017, 449). Xi emphasises outbound investment in an effort to restrucutre the Chinese economy away from manufacturing to an innovative economy researching, developing and exporting key technologies globally (Tiezzi 2014, 1). China’s rapid growth has not only been accompanied by impressive achievements but also an undersupply of resources, vital for national supply chains.The government has thus made creating sources of raw materials, acquire strategic minerals and acquire knowledge and skills for innovatie solutions for resilient supply chains a priority in the endoverou (Wang, T. 2017, 449). Companies are advised to “where technology innovation thrives, integrate and utilize the latest global technology achievements” to compete with the globally leading competitors, accumulating research and development, before eventually securing the strongest position (Wang, T. 2017, 449).

With a push to acquire technology gloabally the CCP has been simultaneously pushing its organisation deeper into its economy making it compulsory to any Chinese enterprise at home or abroad to establish a CCP group within the company: “Any organisation with three or more CCP members has to establish a party group” (Grünberg 2021, 1). In 2018 out of 15.61 million private companies in China 73% had already installed a party cell. The think-tank Merics predicts, that CCP representation and mobilization within private enterprises is likely to grow in the coming years (*Ibid.,* 1).

Made in China 2025

The Chinese governement’s 13th Five-Year Plan (2016-2020) labels technological innovation as one of its strategic goals. “The Made in China 2025 (MiC 2025) plan has been developed to boost innovation in manufacturing, with the intention of elevating a small vanguard of Chinese manufactures to higher level of efficiency and productivity” (Kwok *et. al.* 2018, 4). Xi Jinping sets out to secure an innovation monopoly by advising Chinese companies to foster human capital resources in engineering-related disciplines as well as increase their investments in key technologies overseas yet again. Furthermore, the plan identifies 75 priority technologies and key

sectors, including six strategic ermerging industries. The ICT sector received the highest priority. “Other major goals were enhanced internet penetration, science and technology growth of 60% and the mission to file 12 invention patents annnualy per 10,000 head of population” (*Ibid.,* 3).

China Standards 2035

In many ways the China Standards 2035 policy announced in 2018 and implemented as a goal during the 14th Five-Year Plan (2021 - 2025) in October 2020 is very much in line with the Going Global Strategy and the Made in China 2025 policy (Schaff 2020, 1). Xi Jinping proclaims that China will play a decisive role in setting technical standards in key industries defined in the MIC 2025 goals. These areas include cybersecurity, autonomous and automated driving, new energies, surveillance technologies, cloud and computing technologies as well as biometric scanning (*Ibid.,* 1). Yet again, Xi emphasises the importance of obtaining and producing key technologies, as well as futher implementing the BRI (Otte 2020, 1).

The Belt and Road Initative

Since the announcement of the BRI project in the “Visions and Actions on Jointly Building Silk Road Economic Belt and 21st-Century Maritime Silk Road” (FMRC 2013) the Chinese Government has released 20 further statements on the project, yet the scope of the project, as well as the full investments and ongoing projects, often remain unclear. The BRI framework is suggested to be multidimensional: “The Whitepaper goes beyond the ambition of simply connecting economies by specifically mentioning the establishment of a common security element on land, sea and air passages. In another passage, China stresses the necessity to cooperate in matters beyond infrastructure, such as climate change and security. Although the BRI is portrayed to be an economic initiative, the text itself states, that it strives to create “connectivity on a higher level” (FMRC 2013). The paper dives into a number of policy matters further suggesting the establishment of new models of international cooperation and global governance, that reflect common ideals and contribute to world peace and development alike. The BRI has an economic strategy as well as a political agenda, that openly challenges established international organisations, that are already in the “pursuit of human society” (*Ibid.,* in Halbig 2019, 8 -10). Within this framework China has established the forum of 17+1 (former 16+1 that has a chance to become 16+1 once again, if Lithuania leaves the framework) (Eggert 2021, 1), which constitutes a group of countries closely collaborating with China along the physical Belt and Road. An increasing number of EU Member States have joined this group which is why the following

sections on China's geopolitical investment strategy within the EU (FDI) will take a closer look at the relations China has established with individual member states.

3.3.2. Economic level: Chinese Investment, Trade and Innovation Strategy

Trade

Since 2000, China's GDP has almost multiplied fivefold, at an average growth rate of 9%, consistently staying above 6% (Garcia-Herrero *et al.* 2020, 6). As Chapter 3.2.2. demonstrated, China is the leading coutnry in ICT and high-technology exports. The EU is not only highly dependent on Chinese exports from these two sectors, but also dependent on the export of R&D conducted in their companies operating in mainland China as well as materials necessary to produce key-technologies. New high-tech innovations such as solar power, clean energy, fiber-optic cables, high capacity batteries, military tech and smartphones (*Appendix 22.),* logically require new resources, so called Critical Raw Minerals (CRM), or rare earth elements (REEs). CRMs describe 17 types of metals, which are indispensible for the production of multiple strategic products.

The world's leading provider of REEs is China with an estimated supply of 55 million tons followed by India (35 million tons) and the United States with (13 million tons) (NATO ENSEC COE 2020, 27). The EU relies on China for 98% of its rare earth imports (Leyen 2021, 1). This high level of dependency on Chinese resources is confirmed by NATO Energy Security Centre of excellence (NATO ENSEC COE): 80% of the global capacity for lithium-ion batteries are in Asia, 69% being in China (*Ibid.,* 19). "Over the last decades, China has established itself as the leading rare earth provider through a series of aggressive actions such as attempts to acquire any physical mining territory and mining companie available. China has purchased mines outside its own territory, most notable in Australia and Africa. Between 2005 and 2017 China invested 58 billion in USD in sub-Saharan African mining and energy sectors" (*Ibid.,* 32). China now holds the monopoly over the essential resources vital in production of strategic high-technologie (*Appendix 30*). The entire European industries' supply chain is dependent on Chinese REE exports to the EU.

Although the Belt and Road Initative (BRI) is sometimes defined as merely an infrastructure project, it encompasses a wide array of fields with an ever increasing scope of areas (Garcia-Herrero *et al.* 2020, 43). Even the aspect of trade has in recent years increasingly gained in importance. "China has strengthened its effort in negotiating and concluding free trade agreements (FTAs) with BRI countries. China currently has FTAs with 16 countries/regions, with ten of them

being involved in the BRI" (*Ibid.,* 43). This is an important observation, because FTAs lay the foundation for more than just trade relations. They facilitate engagement and improve the development of the institutional framework which extends beyond trade aspects (*Ibid.,* 43).

FDI

According to the Chinese Ministry of Commerce China's outward FDI increased from USD 21 billion in 2006 to USD 158 billion in 2017 (*Ibid.,* 29). Approximately 20% of outward FDI flows go to the EU and the UK. Although there is a discrepancy between the investments the Chinese governemnt reports and the official statistics compiled by the Commission's European Statistical Office (Eurostat) both data sets reflect the same trend (Rühlig 2020, 20) – increasing Chinese FDI flows to the EU in recent years (*Appendix 28* and *29*). While Eurostats data reflects a continuous increase in FDI flow to Europe, the information provided by the Chinese Ministry of Commerce shows a peak in 2016 followed by a decrease afterwards.

Recent data shows, that in 2019 Chinese FDI and Chinese State owned Enterprises (SOEs) investments in the EU continued to decline (Kratz *et. al.* 2020, 7) (*Appendix 28).* "Chinese FDI in the EU dropped by 33% last year, from €18 billion in 2018 to €12 billion in 2019, bringing the total back to 2013 levels" (*Ibid.,* 7). According to the 2020 study by Merics in cooperation with the Rhodium Group this decrease can be explained by the increasing EU oversight over third-country FDI inflows. Acquistions and other equity investments have become more difficult for Chinese firms. Simultaneously, these FDI restrictions have encouraged Chinese investors to pursue more Research and Development (R&D) collaborations, once again managing to secure strategical technology for themselves (*Ibid.,* 7).

The continuous and significant Mergers and Acquisitions (M&A) by China within Europe, EU and neighbouring countries to Europe have been increasingly concerning to the EU. Notably, investments made by SOEs are increasingly worrisome. As Figure 6 shows, Chinese FDI Transactions in the EU by SOE rapidly increased in a short amount of time from 2011 till 2019, peaking in 2017 accounting for two thirds of FDI transactions that year. This trend can be attributed to the government's push to upgrade China's industries in the established key industries on the basis of the Made in China 2025 plan. Government funds saw a significant increase and "have been put at companies disposal enabling them to upgrade key sectors, such as the semiconducter industry, through M&A of companies abroad (Garcia-Herrero *et al.* 2020, 30ff.). Chinese companies are becoming major competitiors shifting their FDI focus away from hospitality and

commercial real estate to strategically important areas. “From 2000 to 2019 Chinese FDI was invested in transportation and infrastrucutre (29.1%), Information and Communications Technologies (ICT) (12.4%) and energy (10.1%) (Rühlig 2020, 22).

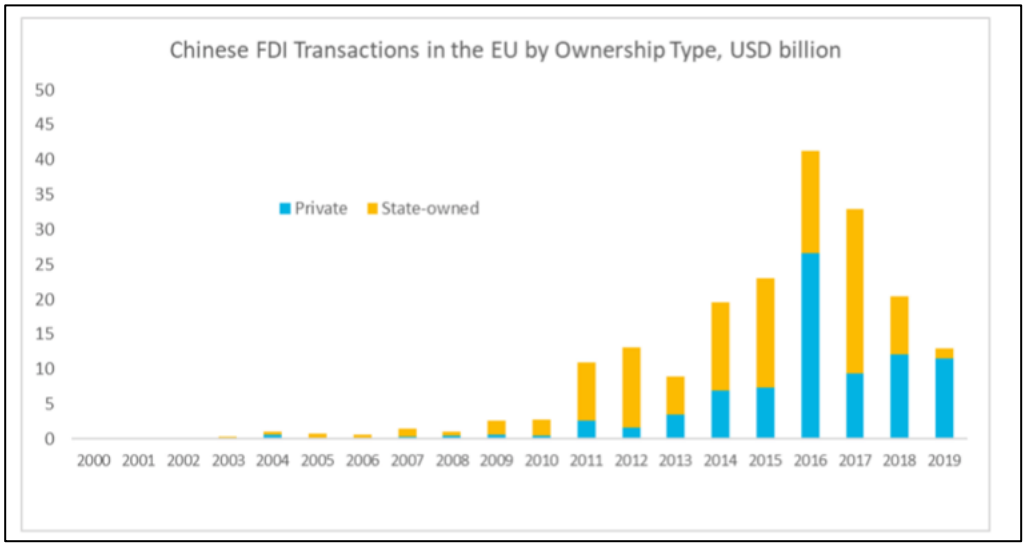

Figure 6. Chinese FDIs in the EU in the period 2000 – 2019
(Source: Rühlig 2020, 22); depiction by Rühlig 2020, 22.

Globally, and especially within Europe, it can be observed, that Chinese FDI targets in particular high-technology sectors such as ICT, software, cloud technology, financial services and semiconductors (*Appendix 19.* and *20.*) drawing the attention from European policy makers (Garcia-Herrero *et al.* 2020, 30f.). Some examples of significant acquisitions by Chinese investors in the EU are:

- 2009: Rio Tinto for US$19.5 billion. Aluminium, basic materials, United Kingdom (Hellström 2016, 21).
- 2010: Volvo Personvagnar AB for US$1.8 billion. Automotive company, Sweden (Hellström 2016, 21).
- 2012: Energias de Portugal for US$3.5 billion. Power utility company, Portugal (Rühlig 2020, 23).
- 2013: Eni Spa for US$4.2 billion. Energy power utility company, Italy (Hellström 2016, 21).
- 2014: CDP Reti for US$2.8 billion. Holding Company, utilities, Italy (Rühlig 2020, 23).

- 2015: Pirelli for US$7.7 billion. Automotive equipment and components, Italy (Rühlig 2020, 23).
- 2017: Logicor for US$14 billion. Transportation services and logistics, United Kingdom.

In order to create a more accurate picture of Chinese FDI in the EU the Commission created a new database, the EC-JRC Foreign Ownership Database, which compiles individual companies' balance sheets. This method of aggregation enables the EU to "capture foreign ownership of more than 50% of the capital of unlisted companies and the ownership of the largest shareholder(s) for publicly listed companies. […] Based on the EC-JRC Foreign Ownership Database, the total amount of assets, including FDIs, controlled by Chinese investors at the end of 2017 was €2.114 billion. This represents 0.89% of total companies in the EU by value, and 0.18% of total number of companies in the EU" (Rühlig 2020, 21). According to this database the main recipient of Chinese investments in the EU at the end of 2017 were the UK (€1.771.557 billion), followed by the Netherlands (€190.199 million) and Ireland (€29.311 million) (Ibid. 21f.,58) (*Appendix 10* and *18*). Over the time period from 2000 to 2019 the cumulative value of Chinese FDI transactions were predominantly in the UK (€50.3 billion), Germany (€22.7 billion), Italy (€15.9 billion) followed by France (€14.4 billion) (Kratz *et. al.* 2020, 11). The EC-JRC Foreign Ownership database merely compiles data of EU companies controlled by Chinese investors, meaning the investor holds more than 50.01% of its shares. Therefore, the database does not capture a full picture of all Chinese investors in EU companies with an ownership below 50% (*Ibid.,* 58).

China's emergence as a capital exporter is largely contributed to the Chinese government's 12th and 13th five-year plans for 2011 – 2015 and 2016 – 2020, which encourage overseas acquisitions and mergers. Intensifying foreign investment has enabled China to increase its influence in the world-wide supply chain, making other participants in the global market more dependent on Chinese capital. Simultaneously, through overseas investmens China has gained access to advanced technology and high quality brands increasing its influence further. In addition, the Chinese Belt and Road initiative (BRI), also known as One Belt, One Road (OBOR) has enouraged enterprises to invest overseas and along the physical land road crossing over mulitple national borders into the hemisphere of the EU (Hellström 2016, 11). Promotion of outward FDI has come as a direct order from the PRC multiple times in recent years. Xi Jingping has made it very clear in the overwhelming majority of speeches he has given since 2012 (China Ministry of Commerce 2015, 1) that overseas investment is a priority for the leadership and vital to China's future position in the world, especially in key industries (Hellström 2016, 12). Xi Jinping further stresses the need

for investments in R&D, new modes of investment cooperation and energy resources (*Ibid.,*1). Rühlig argues that "the BRI is the most significant Chinese investment strategy for economic growth. […] It aims to increase China's influence abroad, including on the EU" (Rühlig 2020, 47). Futhermore, the issue remains on the scope of the BRI project itself: "There is no consensus among experts on the definition of the size and scope of this initiative. The BRI is a complex initiative that is constantly evolving, which makes it a moving target for EU policy makers" (*Ibid.,* 47). For researchers and policy makers alike the BRI investment strategy is difficult to fully track because it is mainly financed by the Chinese state directly. Therefore information on the precise scope of projects and outward FDI along the corridor is limited. In 2019 the funding by the Chinese government was estimated to be approximately US$750 billion. Although this amount has various origins (*Appendix 21.),* these instruments are mostly state-owned or nationally funded (Rühlig 2020, 54).

Founded in 2012 as a cooperation between China and 16 members of the CEEC, there are currently 12 EU Member States within this constellation. The 17+1 framework is highly active not only within Europe but also in the EU direct hemisphere, which by application affects the EU's security and defence as well as policy making in the Western Balkans as five countries have acquired candidate or potential candidate status (*Ibid.,* 42). The 17+1 countries attract high levels of Chinese FDI. Five countries in particular have attracted significant investments in the last several years, all of them EU Member States; these are the Czech Republic, followed by Hungary, Greece, Poland and Lithuania (*Appendix 27*). In 2017, the Czech Republic received the largest investment by China, reporting €686 million in FDI stock which accounts for 0.3% of total FDI stock in the EU (*Ibid.,* 43). China does not soley invest in EU Member States within the 17+1 cooperation. In the aftermath of the financial crisis of 2008/09 China's investments increasingly targeted the countries affected the most by the crisis which included Spain and Portugal where China acquired utilities, energy and real estate companies (Hellström 2016, 17). In addition, Chinese acquistions have strongly focused on the so called *Big 3*, namely Germany, the UK (former EU) and France (Hellström 2016, 20). Within these countries Chinese investors have been especially eager to acquire technology, know-how and companies within the energy, automotive and high-tech manufacturing sector (*Ibid.,* 17).

Combined within the overarching framework of the BRI China has to date signed Memorandums of Understanding (MoUs) with 15 Member States on BRI related investment projects, as well as a wider array of topics including, for example, nuclear cooperation (French New Areva – China

National Nuclear Coopeartion 2018) and the establishment of a Sister Airport Relationship with Finland in 2016 (Rühlig 2020, 44). Although Member States are obliged to inform the European Council on agreements relating to investments, economic and industrial cooperation with non-EU countires, the Commission has reported, that "it has not been informed about any such agreements signed by Member States by the date of this review" (*Ibid.,* 45). This is one of the reasons as to why the EU has pursued and implemented a common FDI screening mechanism so Chinese invstments, in particular, are reported to the EU on a regular basis (*Ibid.,* 45). When not informed, it remains rather difficult for the EU to adopt one common strategy and formulate a coordinated response towards China's investment strategy. This remains a significant problem to this day.

Trade Defence

As assessed in Chapter 3.2.2. the EU is an avid user of Trade Defence Instruments (TDIs), especially frequent Anti-Dumping duties (*Figure* 3) (Garcia-Herrero *et al.* 2020, 19f.). In comparison, China has been relatively modest in deploying TDIs. China initiated its first case of Anti-Dumping duties against the EU in 2002, one year after China's accession to the WTO (*Ibid.,* 20). Between 2002 and 2010 China merely initatied 1.7 cases per year against the EU and solely one case in 2019. The number of initiated AD cases has remained very stable over the last 20 years (*Ibid.,* 20). The same can be said for Chinese AD duties in force against the EU which have remained relatively stable. After an increase in 2003 from 1 case in force to 15 cases in force by 2013 AD measures in the last six years increased slightly to 15 measures in force in 2019 (Garcia-Herrero *et al.* 2020, 23). In respect to the economic sector "Chinese AD measures against the EU focus on chemicals and pharmaceuticals (6 cases in force in 2019) and metals (3 cases)" (*Ibid.,* 23f.). In constrast to the EU AD measures in force by sector the Chinese side also includes rubber and plastic with 3 cases in force in 2019 (*Ibid.,* 24).

Research and Development (R&D)

Often heard and repeated, "R&D is the backbone of innovation" (China Power Team 2018, 1). Increased investments in R&D increase the output of Intellectual Property (IP), which in tangible terms can be measured in patents. The leading innovative country simultaneously increases its power and influence in the process of international technical standard setting. High governement investments in R&D hence result in not only financial net gain but also geopolitical influence. Therefore this next section will accumulate data on the PRC's growing incentives in the area of R&D, IP and technical standardisation, as well as policy measures that have been implemented to strengthen the Chinese government's ambitions in these areas creating a more competitive

environment for other actors such as the EU. China is "increasingly seeking to contend with countries whose economies are deeply rooted in innovation-based growth" (*Ibid.,* 1). In line with China's 14th Five-Year Plan (2021-2025) and Made in China 2025 strategy it is the PRC's goal to make China a global leader in innovation and increase self-sufficiency in key future technologies (Hamilton; Quinlan 2021, 22). In President Xi Jinping's speech (2017) at the 19th Party Congress on October 18th 2017 Xi called on China to "strengthen basic research, and make major breakthroughs in pioneering basic research and groundbreaking innovations" (Xi Jinping 2017, 1). R&D is a state-led field which is actively supported by the full resources of the Chinese Government. While China's R&D spendings in 1991 barely accounted for 0.72% of its GDP R&D expenditures have surged to 2.23% of GDP in 2019. "China's R&D expenditures witnessed a more than 35-fold increase from 1991 to 2018 – from $13.1 billion to $462.6 billion" (China Power Team 2018, 1). China has rapidly increased its expenditures, with the result that they are now investing as much in R&D as Japan, Germany, South Korea and France combined (*Appendix 12*). As Figure 7 demonstrates, in 1991 China ranked in 9th place of the countries with the highest spendings on R&D (*Appendix 13*), behinde four EU countries: Germany (3), France (4), UK (6), Italy (7). In 2018 China surpased EU competitors ranking as the second country with the highest spendings on R&D behind the USA. In 2018 four EU countries were in the top 10, although having dropped in the ranking with Germany (4), France (6), UK (7) and Italy (10).

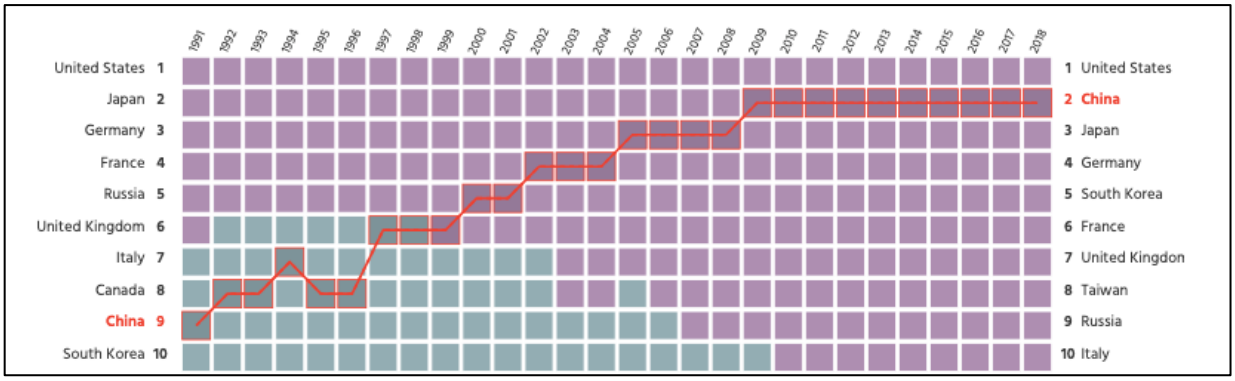

Figure 7. R&D Spending Around the World

(Source: China Power Team 2018, 1), depiction by China Power Team 20218

For the last 19 years Beijing has consistently poured the largest share of its R&D resources into experimental development, equaling approximately 80% from 2000 till 2019, with most investments diverted to the fields of data storage capabilities and telecommunication technology. In comparison, the United States and Japan merely devoted 62% of R&D on experimental

development (*Ibid.,* 1). Although the main source of R&D funding has shifted from the Chinese Government to State owned enterprises (SOEs), the influence and the PRC leadership remains the same. "SOEs are subject to orders from government officials […] SOEs also have preferrential access to bank loans from China's state-owned banks" (*Ibid.,* 1). Therefore it can be said, that Chinese businesses remain under strong PRC control and have access to bank loans that privately owned European firms do not. Therefore Chinese R&D funding is often viwed by the EU as government funding, which distorts the market, thus creating an unfair advantage (*Ibid.,* 1).

The European Commission's annual report from 2020 "EU Industrial R&D Investment Scoreboard" (Grasson *et. al.* 2020) confirms this trend. Ten years ago in 2010 the EU invested more than China into all four major sectors (ICT, Health industries, ICT services, automotive industry) in R&D. Today R&D investment of Chinese companies into the ICT sector has completely overtaken that of EU companies. In 2019 China invested 30% into ICT producers and 17.5% into ICT services, while EU companies merely allocated 14.2% into ICT producers and solely 7.0% into ICT services. "The average R&D investment per company has grown significantly in China, from €47.2 million in 2010 to €274.4 million in 2019" (*Ibid.,* 53), which is a growth of 477.1% in ten years. Overall, Chinese investments into R&D has skyrocketed over the past ten years, nearly closing the gap with the EU.

Futhermore, newest reports from 2020 reflect this continuous trend of high-end Chinese spending on R&D as well, hitting a record high of 2.4% of the PRC's GDP. China's total expenditures on R&D in 2020 rose 10.3% from a year ago to $377.8 billion (Hancock; Lin 2021, 1). The Chinese Enterprise that spends the most on R&D is Huawei with €16.7 billion in 2019, equalling an increase of 31% compared to 2018 (*Appendix* 11). China outranks EU companies scoring the 3rd place of top 20 R&D Spenders of 2019. In this ranking the EU is represented by solely one Member State: Germany. Germany ranked four times with Volkswagen (6), Daimler (11), BMW (19) and Robert Bosch (20) – all with a growth rate of under 7% compared to 2018 (Hamilton; Quinlan 2021, 23).

Intellectual Property Rights

"Innovation is a primary source of national power. A country's ability to develop new products and methods of production enables it to produce the goods desired by others. In turn, innovation creates wealth, leads to technological advancement, and fosters further innovation through the development of derivative products" (China Power Team 2016, 1). Therefore, when measuring

China's growing international influence, it is essential to consider the sources of Chinese innovation. One way to measure intangibles is through Intellectual Property registered in form of patents. As mentioned in 3.2.2. of this research in 2020 China filed 7% of the total patent applications with the European Patent Office (EPO). Although this number may seem relatively low in comparison to EPO member states that filed 38% more patents than China, it is still a significant increase of 9.9% of applications compared to 2019. In total China filed 12,618 patents with the EPO. The leading Chinese firm that had filed the most applications last year in 2020 was Huawei Technologies with 3,113 patents registered (EPO 2021, 1). Yet, when one looks at other data sets such as the annual "World Intellectual Property Indicators" published by the World Intellectual Property Organization (WIPO) one can make a quite different observation. The WIPO analyzes IP data from 150 national and regional offices around the world (WIPO 2020, 5), one of them being the National Intellectual Property Administration of the People's Repubic of China (CNIPA, former State Intellectual Property Office).

Table 6. Patents filed by China 2010 - 2019

Patents				
Year	**Applications Worldwide**	**China**	**Growth Rate compared to previous year (%)**	**Share of world total (%)**
2010	909,000	293,066	not registered	not registered
2011	2,140,000	526,412	not registered	not registered
2012	2,350,000	560,681	not registered	not registered
2013	2,564,800	825,136	not registered	26,40
2014	2,680,900	9,28,177	12,50	28,6
2015	2,887,800	1,101,864	18,70	38,1
2016	3,127,900	1,338,503	21,50	42,8
2017	3,168,900	1,381,594	not registered	43,6
2018	3,326,300	1,542,002	11,6	46,4
2019	3,224,200	1,400,661	-9,20	43,4

Source: WIPO (2009 – 2020), author's analysis and depiction

Hence, the WIPO has a much wider data set which has accumulated Chinese Patents filed worldwide, their growth rate, as well as their share of the world total. Therefore, the author compiled the publicly obtainable data from the WIPO database from 2010 to 2019 and calculated the annual growth rate of Chinese patents, as well as their share to the total patents filed globally (*Table 6*). Despite a substantial decline in 2019 it can be said, that the long-term trend (*Appendix*

7) shows that Chinese patent applications have increased rapidly over the last decade (*Table 6*). 2019 was the first year that registered a decline since the 2009 financial crisis. Even though patent applications worldwide decreased by 3% in 2019 the CNIPA received the highest number of patents applications, registering 1.4 million patents, which is more than twice the amount received by the United States Patent and Trademark Office (USPTO). Since 2011 China has consistently claimed the top spot of most patents filed worldwide, which is reflected in their share of world total (%), peaking in 2018 at 46.8% of the world patents filed (*Ibid.,* 12f.) (*Figure* 8).

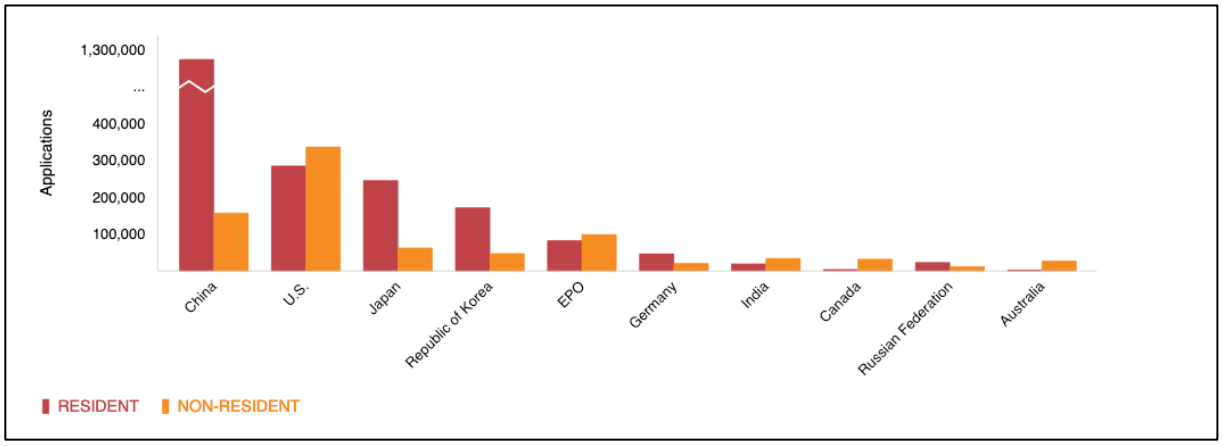

Figure 8. Patent applications at the top 10 offices, 2019
(Source: WIPO 2020, 13), depiction by WIPO (WIPO 2020, 13).

The EC comments on the long-term trend of the significant increase in Chinese patents in its annual "Report on the Protection and Enforcement of Intellectual Property Rights in third countries" (EC 2020b) by emphasizing this long-term trend as being potentially harmful, negatively impacting European companies. The report calls attention to the lower standards in China for granting patents concerning intellectual property rights. The number of Chinese patent applications is growing exponentially as a result of quantity-based top-down incentives set by the Chinese government. This is leading to serious concerns about the quality of granted patents. By increasing Chinese influence worldwide, lower standards Chinese producers can secure exclusive rights to inventions and thereby play a key role in areas of innovation (China Power Team 2016, 1). Gaining the competitive advantage.

Furthermore, China has recently begun tightening its Intellectual Property Regulations (IPR) by implementing substantial reforms of its administrative responsibility for IPR. Founded in 1980 the former State Intellectual Property Office of China (SIPO) was transformed into the Chinese

National Intellectual Property Administration (CNIPA) in 2018 with extended responsibilites for all IPRs covering patents, design, trademarks, codes, programming and geographical indications for non-agricultural products. The CNIPA reports to the new State Administration for Market Regulation (SAMR) established in 2018 which overviews IPR infringements and enforcement matters. The SAMR reports directly to the State Council. The National Copyright Administration of China (NCAC) remains responsible for copyright infringements and reports directly to the State Council as well (EC 2020b, 16). Another administrative reform included the establishment of three specialised IP Courts in Beijing, Shanghai and Guanghou. It has been followed by the creation of so-called Internet courts in Hangzhou, Beijing and Shanghai specializing in and consequently dealing with IPR infringements. Futhermore, China created a specialiced IP court as part of the Supreme People's Court (SPC) to focus mainly on patent cases. The creation of such specialized IP courts within the SPC is on the one hand very promising as it could increase the coherency of court decision. On the other hand administrative reforms increase the enforcement of IPR infringements as well as the resulting persecution and repercussions. In 2019 the National People's Congress updated its IPR legislation and in that process ameneded serveral IPR laws: "It strenthened the trade mark law regarding bad faith registrations, and modified the anti-unfair competition law to reinforce the protection of trade secrets," (EC 2020b, 17) simultaneously increasing enforcement and repercussions for IPR infringements (*Ibid.,* 17).

The EC's Working Paper (EC 2020b) remarks, that "although (administrative) reforms do not go as far as the EU had hoped for (they may lead to more coherent application of IPR law), adding, that (new) laws would be welcomed" and, that "it is too early to assess the effect of these administrative reforms" (*Ibid.,* 17). IPR enforcement in China differs significantly between provinces and cities. Beijing and Shanghai are reported to have coherent standards of administration and courts, whereas other parts of China lack the expertise of IPR enforcement leading to serious problems (*Ibid.,* 20). Foreign rights holders report difficulties in obtaining coordinated enforcement action from authorities (*Ibid.,* 20). With the administrative reforms we could expect two trends to form in the coming years: The first trend could be that a nationwide administration leads to coherent regulations that are reasonably and soundly enforced. A second trend could be that a coherent administration may increase legislative hurdles and strengthen its IPR enforcement, adding to the difficulties foreign stakeholders are already subjected to, by for instance creating high-end export controls.

Moreover, the Chinese government has tightened IPR by making it more difficult for foreign intellectual property rights holders to export their intangibles. Intellecutal Property Export Controls have been in force in China since 1998 (Baruzzi 2020, 1) but just recently the Chinese Government has heightened controls once again. On October 17, 2020 the Standing Committee of China's legislature, the National People's Congress (NPC), passed the "Export Control Law of the People's Republic of China" (NPC 2020) which went into effect on December 1st, 2020. According to the U.S.- Congressional Research Service (Sutter 2020) the law gives China's government heightened authority to "impose terms on transactions among foreign firms, joint ventures and other partnerships within China, as well as on exports and offshore transactions" (Sutter 2020, 1f.). The law authorizes the government "to exercise export controls in retaliation against other countries' actions and to impose temporary export controls on items" (*Ibid.,* 2), which are not already listed in the 2020 amended "China's Catalogue of Technologies Prohibited or Restricted from Export" (Ministry of Commerce and Ministry of Science and Technology 2020) (*Appendix 5*). The newly amended catalogue now includes technologies in the areas of: (1) biotechnology, pharmaceuticals, and medical equipment, (2) 3D printing, (3) construction, petroleum, and power equipment, (4) machine tools, (5) high speed wind tunnel designs, (6) aerospace bearings, (7) unmanned aerial vehicles (UAVS), (8) space-related remote sensing image acquisition, measurment instruments, and data transmission, (9) vaccum technology, (10) mapping, (11) information processing technologies and (12) cryptographic and cyber-related technologies (*Ibid.,* 2).

The Chinese government has widened its scope of IPR export immensly by prioritizing future technologies and restricting foreign investment in these areas, while simultaneously seeking technology transfer through foreign partnerships, acquisitions and cohesive practises. The Chinese government defines technology exports as "the transfer of technology from the People's Republic of China to overseas through trade, investment or economic and technical cooperation" (Baruzzi 2020, 1). Intangibles can be transferred as "patent assignment, transfer of patent application rights, patent licensing, transfer of technology secrets, technical services and other forms of technology transfers" (*Ibid.,* 1). If foreign firms or joint ventures now seek to export one of these twelve technologies (in tangible or intangible form) a license must be acquired through the "Local Intellectual Property Office", as well as the "Local Commerce Department", which after a review can decide to grant a "License of Technology Export" (Song 2020, 1) (*Appendix 6*).

In practical business terms the heightened export controls imposed by China on foreign firms and joint ventures operating in China as well as overseas have severe consequences. According to an early assessment published by Merics in October 2020 increased export controls "significantly impact European countries with extensive manufacturing and research and development (R&D) operations in China. […] It remains to be seen how China will make use of these new export control powers. The law at the very least acts as a show of strength that signals China will no longer stand idly by while other countries restrict the sale of technologies to Chinese companies. At the very worst it will give the Chinese government new means to punish the US and other countries" (Merics 2020, 1). Since the law was ratified in December 2020 no quantifiable data of EU companies struggling to comply with the new export law has been released. Nevertheless, it can be expected, that European companies with extensive manufacturing and research development operation in China will be affected. These include, for example, German automotive companies that moved their R&D sites from Germany to China during the last decade. The VW Group alone operates 33 manufacturing and R&D sites in China (Heide; Murphy 2020 1). The BMW AG has 31 manufacturing and R&D sites in China. Both companies research future technologies such as E-Mobility, battery capacity and autonomous driving technology in mainland China (BMW 2020, 1). Although recent cases on export controls on IP have been reported, there is no database that compiles these cases yet (Merics 2020, 1).

Technical Standardisation

Another trade tool to assert power and gain economic, hence geopolitical power, is to gain control over international technical standardisation. As previously mentioned at the beginning of the IPR segment, countries' power and influence can be measured by the intellectual property they produce in tangible terms through patents. For the last 10 years China has consistently registered the highest amount of patents worldwide and owns a world share each year by over 40% of registration. A country that drives innovation and produces intellectual property tends also to control the norms and stardards by which other players must oblige. Circling back to the chapter on the EU's dominant role in standard setting for the last 40 years (Fuest 2020, 1), China has studied the European approach. Rühlig observes that, "The European influence and prestige as the leading actors in international technical standardisation has prompted China to study the European approach" (Rühlig 2020, 22). China may very soon assume a similar role for third countires, particulary in the developing world when it comes to standards (*Ibid.,* 22). To recall Werner von Siemens' famous saying: "He who owns the standards, owns the market" (Kynge; Liu 2020, 1) technical standardisation is an underestimated and under researched (Rühlig 2020, 5) field, with

which one can wield enormous power by dictating market compliance rules. Being able to set the international standards means, other countries must comply with your order. Western companies have set the standards for various products and the rest of the world has had to comply if their manufacturers wanted to maintain access to the world market (Fuest 2020, 1). “Standard-setting has for decades largely been the preserve of a small group of industrialized democracies. Everything from the width of train tracks, to software, satellites, the frequencies that mobile phones use and a whole gamut of rules about how electronic gadgets work and process data have been decided by western-dominated standards organizations” (Kynge; Liu 2020, 1).

Throughout the last decade Chinese leadership has continuously prioritised technical standardisation. The PRC leadership sees an international strategic dimension to controlling standard setting. While EU countries have a privately driven industry force, the Chinese government has inserted itself into this process and has accelerated a state-directed approach to gain a political advantage as it had observed European countries doing through standardisation dominance. Therefore, the PRC has massively increased its efforts and presence in the specialized technical committees (TCs), their subcommittees (SCs) and working groups (WGs) of international standardisation organisations like ISO, IEC, ITU (International Telecommunications Union) and 3GPP (3rd Generation Partnership Project) (Rühlig 2020, 21).

Back in 2018 China announced a program called “China Standards 2035” (Shira 2020, 1) which sets the goal to gain dominance over the international standardisation process by 2035. One of the most obvious signs of increased Chinese influence is also its growing leadership positions in international organisations. From 2015 - 2018 Zhang Xiaogang served as the first Chinese president of the ISO. Shu Yinbiao is president-elect of IEC and had been the organisation’s Vice-President from 2013 – 2018. Zhao Houlin is currently serving his second term as General-Secretary of ITU (Rühlig 2020, 22). Chinese influence can also be measured by the share of positions they hold within the ISO’s and IEC’s TCs, SCs and WGs. In a span of just seven years from 2011 till 2018 China’s share of TC and SC positions in the ISO grew from 5% to 8.21%. In the same time span their shares in WGs rose from 2% to 6.58% (*Appendix 26*). China may still be behind Germany, which currently accounts for 36 IEC positions followed by the USA with 26 and Japan with 24, yet undeniably there is a striking trend of increasing Chinese presence among standardisation bodies. Christoph Winterhalter, the executive of the German Standardisation Organisation (DIN) reports that for every new opening they consistently receive almost exclusively Chinese applications (Fuest 2020, 1).

Within the framework of China Standards 2035 the Chinese government has immensely promoted universities, research groups, think tanks and private entities to develop new standards and norms. Since this strategy was announced in 2018 Christoph Winterhalter has reported that the ISO and the IEC have been flooded with Chinese proposals, targeting especially key technologies, such as Industry 4.0, blockchains, quantum computing, high capacity batteries, 5G data flows, drone technology and facial recognition software (*Ibid.,* 1). In the last three years the Chinese companies ZTE, Huawei and China Telecom alone have proposed more than 20 standardisations to the ISO concerning facial recognition software and artificial intelligence surveillance technology (Fuest 2020, 1). Nowadays, more than half of the proposed standards are brought forward by the PRC. Since March 2019 China has proposed eleven internet standards in the ISO/IEC framework (Kynge; Liu 2020, 1). According to Winterhalter the EU and the USA have completely fallen behind and may not be able to catch up anymore. While the PRC focuses on a state-led approach the EU and the USA still have a private entity led approach which is dependent on captial, capacity and the need for necessity (Fuest 2020, 1). Although in the past a German entrepreneur may have deducted, that "he who owns the standards, owns the market" (Kynge; Liu 2020, 1) the PRC has taken this to heart and is actively driving the process.

China may not have yet achieved dominance through the ISO but according to Jonathan Hillmann from the CSIS has set the standard for surveillance technology through widespread export and foreign adoption of its technology (China Power Team 2018, 1).. Today China is the leading provider in surveillance technology with one company, the Hangzhou Hikvision Digital Technology, controlling over 20% of the global market share (*Ibid.,* 1). After enough purchases and deals Chinese standards may become the standards without a formal process. One of the best examples for this strategy are Smart Cities, that China has exported worldwide. Since 2013 China has installed 70 Smart Cities with artificial intelligence surveillance all taking place in countries that have also participated in the Belt and Road Initiative (*Appendix* 25.).

Smart Cities combine key technologies, from mobile and application development to biometic technology, GPS tracking, artificial intelligence and cloud data: "Smart cities integrate data from intrusive surveillance systems to predict and prevent everything from fires to natural disasters and political dissent" (Wang 2021, 1). Take together, cities in western and southern Europe signed up for a total of 25 such smart and safe projects. These cities employ technology that operate solely on Chinese standards and norms and is incompatible with any other technology. Smart Cities

demonstrate China's lead in high-tech and standardisation setting. Chinese technology is "both functional and affordable" for many and is encompassed by the promise of the newest developments in high-tech, as well as safety, security and control (*Ibid.,* 1).

Another sign of China's growing influence in technical standard setting through export and foreign adoption is the cooperation agreement on technical standardisation China signed with 49 countries and regions along the BRI in June 2019. Only three months later this figure had risen to 90 agreements with 52 countries (Rühlig 2020, 25). A concrete example hereof is Turkmenistan which has adopted 83 Chinese technical standards (*Ibid.,* 25). In an interview with the Financial Times Adam Segal, director of the digital and cyber space policy programme at the Council on Foreign Relations, a New York based think tank, expresses his concerns over China exporting standards to third countries: "Industrial standards are an important area of contesting the new cold war […] An intensifiying US-China battle to dominate standards, especially in emerging technologies, could start to divide the world into different industrial blocks. In the same way that rail passengers who travel from western Europe to some former Soviet block countries must to this day change trains to accommodate different track widths, strategic competion between the U.S. and China raises the spectre of a fragmentation of standards that creates a new technological divide" (Adam Segal in Kynge; Liu 2020, 1). Technological fragmentation may also be possible in technologies such as semiconductors, artificial intelligence and data flow networks as well. According to Adam Segal China will reach its 2035 standard goals by either gaining dominance in standardisation setting institutions or by exporting its technology and setting standards through market forces. Either way the PRC will achieve its goal of controlling technical standardisation (Adam Segal in Kynge; Liu 2020, 1).

4. Results and Discussion

4.1. Political level: Results

Bilateral Relations

This paper has demonstrated that in an effort to find a common ground for cooperation the EU and China have established a dialogue architecture which is accompanied by various working groups

and fora that are supposed to meet on an annual basis. This paper further established that both parties have released joint communications on their cooperation as well as individual policy papers. One could argue that the relationship is characterized by high levels of institutionalisation which lead to regular cooperation, agenda-setting and socialisation, and a spill-over effect. This may have been the hopes of the EU when they initially implemented this policy framework. The author argues that although this may have appeard to be a possibility at first, the EU has changed its tone on China dramatically. It has become evidently clear to observers and EU-policy makers alike that a spill-over effect of the EU-promoted values, democracy, human rights and open market strategy are less likely than ever before. Nevertheless, this structure remains intact. However, the question is just how effective this structure has been in providing a comprehensive cooperation. This research paper presented evidence that bilateral cooperation does not always produce tangible results and based on the evidence compiled on Chinese acquistions, investments and trading tactics it remains doutbful that this dialogue architecture has even been an effective tool within the relationship. Although the Comprehensive Agreement on Investment (CAI) can be assessed as a win for the EU, it remains to be seen whether China upholds its agreements. In an international context China has proven otherwise and even within the EU-China cooperation has not always shown to in fact be cooperative. It will be interesting to observe in the coming years how the bilateral framework develops and to what extent and for what personal gains China chooses to cooperate with the EU directly – instead of with its member states individually.

EU Policy on Engagement and Innovation Technologies

Since 2010 the EU has released two policy papers on China**.** All these communiques have defined European strategies towards China and emphasised fields of cooperation and engagement. While all these papers may have related directly to China, they lack to address emerging trends, controversial behavior and China's increasing competitive advantage. Although the "EU-China Strategic Outlook" from 2019 (EC 2019b) labels China as a "systemic rival" (EC 2019b) for the very first time, it fails to formulate and promote a coherent policy option to deter and counter Chinese geopolitical investment strategy. Especially when competing with China in the field of innovation, the EU seems to lack particular policy goals fostering high-technology in key industries. Meanwhile, China has repeatedly been very vocal about their innovation policy goals. In 2018, for the first time, the EU addressed the BRI in a Joint communication which however does not refer to China even once. The EU connectivity strategy attempts to compete with China's Belt and Road Initiative by allocating money to projects in BRI Member countries. Although this is an admirable attempt of the EU to counter China's accumulation of capabilties and influence, it

simply does not compare in its scope. While China is pursuing a clear offensive neorealistic strategy of power gains, the EU seems almost helpless in competing with the finances accumulated by the Chinese government to support this project. If the EU wants to even come close to competing with the BRI, they must cooperate with other major players, such as the USA, India, Japan and South Korea.

Futhermore, in regard to innovative policy, the research was able to demonstrate that the EU's efforts cannot compete with China here again. Although the EU's "first Horizon Europe Strategic Plan" is yet another admirable attempt, it lacks in scope and financing in comparison to the funds the Chinese government has been allocating towards technology for the last ten years. It remains to be seen what tangible gains the EU can win from this new innovation strategy. Unfortunately, this has, as so many other policies, come too late in time to be able to catch up with China in this respective field. The data depicts, that the EU only recently has become aware of the gravity of the field of technology and innovation, which is reflected by its just recent activity over the last two years.

China Policy on Engagement and Innovative Technologies

While the EU lacks a powerful centralized leadership, often sending out mixed messages or no messages at all, China tends to repeat the same message of sovereignty and One China policy. The Ministry of Foreign Affairs of the People's Republic of China (FMPRC) has also put forth two policy papers on the EU since 2010. Besides these, every five years China introduces a five-year plan, which entails a strategy for the next five years. One major difference this paper was able to observe on political level is that when China says something, China does exactly that. In comparison, when the EU finally finds a common consensus after years of discussion on what they want to say, it does not always entail action nor policy implementation. China in retrospect communicates very cleary and directly. Their five-year plans are comprehensible and followed up by political action.

China has been very clear about their ambitions to achieve a technological monopoly. Futhermore, China has been very outspoken about their strategies through which they plan to respectively acquire and accumulate technological capabilites. As early as 2012 Xi Jinping stressses the importance of technological dominance and introduces the "Going Global strategy" at the 18th CPC National Congress. My paper demonstrates, that in all strategies Xi urges companies to pursue the goal of acquiring key technology. He publicly manifests this in the "Going Global

Strategy." He urges companies to invest overseas; furthermore he urges them to acquire the sources of raw materials, strategic minerals as well as the knowledge and skills necessary to foster innovative solutions for resilient supply chains at home.The 13th and 14th five-year plans, one could argue, are an extension of his innovation policy put forward in 2012. He emphasises the necessity of overseas investment as a means to acquire key technologies. Moreover, China prioritzies 75 industries to be obtained and places the ICT sector at the top in 2015. Futhermore, he set an annual goal for patents that must be filed by companies and research facilities alike and assiduously focuses on obtaining positions in standard setting international institutions.

The same clarity can be observed with the announcment of the BRI in 2015. In his speech Xi Jinping is very clear about his goals which he states, even back then, go beyond economic goals. Xi stresses the need for the establishment of new cooperation on climate change, security and the good of human kind – almost directly implying the establishment of new models of international cooperation and global governance that reflect common ideals and contribute to world peace and development alike. The BRI has an economic strategy as well as a political agenda that openly challenges established international organisations. Over the last five years China has been able to accumulate technological capabilites through this framework, increase its influence over other states along the BRI, especially weaker ones. Overall, the BRI has directly helped China achieve a new and enhanced power position, increasing the number of states dependent on it.

4.2. Economic level: Results

Trade and Trade Defence

This paper was able to demonstrate, that the EU's supply chain is highly dependent on Chinese exports. With the developments of new technologies the EU's dependency has rapidly increased within the area of rare earth imports for which is relies on Chinese exports for 98% of these resources. Simultaneously, the EU is highly dependent on exports with 36 million jobs directly connected to export alone. China is the EU's leading supplier not only of rare earths (55 million tones) but also in terms of goods overall. Furthermore, China is by far the leading supplier of high-tech, exporting approximately 30% annually for the last five years. The EU (5.3%) and the United States (8.7%) can hardly compete with that. Although China's GDP (USD 11.520 billion; ca. +5.9% in 2019) has not surpassed that of the EU (USD 16.605 billion; ca. -1,6% in 2019) nor the

United States, the research was able to observe that it has rapidly grown (average 9% per year) and is predicted to catch up with the EU in the next few years.

In the field of trade this paper was able to make the important observation that in recent years China has increasingly been pursuing free trade agreements along the BRI, currently having signed FTAs with 16 countries and regions. While the United States still spends the most on military capacities, namely 3.4% of GDP in 2019, this paper showed that China (+1.9%) has increased its annual spendings and now invests more in its military than the EU (+1.4%) does.

Aggressive and unfair Chinese trading practises – which are state-led and subsidised – distort the global market and have been of growing concern for the EU. The EU has been consistently deploying Trade Defence Instruments (TDIs) against China over the past two decades (26 cases in 2003 to 61 cases in 2019). Although the EU's overall use of TDIs has declined in recent years, China still accounts for 51% of all EU AD duties in force. In comparison, China has been relatively modest in deploying TDIs (15 cases in2019, average 1,7 per year). This is also due to the fact that the EU imports signficantly more from China than the other way around. In 2019, Chinese AD (Anti-Dumping) against the EU focus on chemicals, pharmaceuticals (six cases) and metals (three cases), while EU measures focus on the Chinese metal (28 cases), chemicals (15 cases) and the rubber and plastic sector (five cases)

In an effort to further counter Chinese trading practises and coercive practices directed at the EU or one of its member states, the EU is currently underway to implenting an anti-coercive instrument. The new legislation will expand the scope of regulations and trade policy measures to include certain trade-related aspects such as intellectual property rights (IPR) and technical standardisation. The initiative will seek to deter the threat of coercion, minimize negative effects caused by coercion practices and develop coordinated strategies to counter these, while simultaneously maintaining an open economy. It is set to be installed at the end of 2021. It will be interesting to see if its effectivness can be tracked in tangible terms. China has not yet reacted to this proposal.

Foreign Direct Investments

China's main strategy to acquire and accumulate technological capabilities has been through the means for Foreign Direct Investments within the EU. The research was able to identify that China

has strategically been investing in key technological industries in European companies throughout the last decade, investing specifically in infrastrucure (29.1%), ICT (12.4%) and the energy sector (10.1%). At the same time EU FDI in China predominantly went into the manufacturing sector (28% automotive manufactuing and 22% basic material manufacturing). China's outward FDI increased from USD 21 billion in 2006 to USD 158 billion in 2017 (+ 752.38%). Over the time period from 2000 to 2019 the cumulative value of Chinese FDI transactions were predominantly in the UK (€50.3 billion), Germany (€22.7 billion), Italy (€15.9 billion) followed by France (€14.4 billion). Since 2016 (USD 8.8 billion), EU FDI has declined to USD 7.2 billion in 2018 (-19%). Over half of China's investments in the EU can be attributed to State owned Enterprises which have ramped up their acquisitions over the last decade - peaking in 2017 SoE accounted for two thirds of FDI transactions that year. This can be traced back to them having more government funding at their disposal, allocated by the CCP's Made in China 2025 plan. This trend has become increasingly worrisome to EU-policy makers. Nevertheless, the EU welcomes FDI, with some Eastern European Member States practically inviting China into their country permanently (Czech Republic with €686 million in FDI stock, which equals 0.3% of total Chinese FDI stock in the EU in 2019). China, in the meantime, has implented much more restrictive policies on FDI. The research was able to demonstrate that China has also increased FDI restrictions throughout the last years. The compiled data identified EU FDI practically diminishing. European firms are put at a disadvantage by restricting entire sectors (especially strategic sectors producing key technologies) for investments or solely allowing joint ventures and minority options only. The research was able to identify that the EU has also restricted Chinese FDI leading to its continuous decline since 2016. In return, China has adapted to EU countermeasures by allocating their investments into the acquistion of European R&D facilities. This research has been able to demonstrate this strategy as being another method China deploys to increase technological capabilities.

In 2017, five years after Xi Jinping announced the BRI, the EU finally made an attempt to counter Chinese investments by implementing an EU wide FDI screening mechanism. Although its use is not compulsory, Member States are advised to employ it in an effort to identify and address potential threats to security or public order which FDI may entail. Furthermore, the EU has tried to create a level playing field for investments by balancing the relations through the agreement on Comprehensive Investment (CAI). Although the EU was able to achieve significant gains by negotiating the CAI with China, difficulties with enforcement, monitoring and sanctioning remain. Without these mechanism the agreement is nothing more than an attempt to try to establish a level playing field. At any point China can decide not to comply without having to fear any tangible

repercussions. Furthermore, the ratification of this agreement as well as futher negotiations relating to it remain unclear after both parties recently imposed sanctions on each other. The effectiveness of this agreement remains to be seen. The EU has yet to adequately address China's overarching investment strategy, the BRI. This, for one, is in part due to the fact that twelve EU Member States are part of the 17+1 framework belonging to the BRI framework, as well as 15 other Member States that have signed Memorandums of Understanding within the overarching framework of the BRI with China. A significant number of states have benefited from generous Chinese capital with no responsibilities and obligations attached to it – on the surface at least.

The BRI (approximately USD 750 billion in 2019) has been a difficult area to approach for policy makers because there is no practical consensus on what exactly the BRI is. Is it an infrastructure project, an investment strategy, a geopolitical tool or maybe all of the above? The author argues that it is in fact a political tool through which resources and capabilities are obtained, influence is fostered and dependence of weaker states on China is created. Its aim is to comprehensively boost the power position of China in the game of international politics. Through the BRI China is exporting its techno-authoritarianism system of governance while simultaneously establishing its own international order, encompassed by its own multilateral institutions. Chinese investments, in this context, follow a divide and conquer strategy, undermining EU legitimacy and democratic values. The EU must address Chinese aggressive investment strategies as well as its overarching goal of enhancing its political power position through the accumulation of technological capabilities in a timely manner. Otherwise, China will only increase its leverage and influence in the EU and on its neighbours who have been falling victim to the same aggressive investment strategy.

Research and Development

China has achieved significant gains in the field of R&D contributing to their accumulation of technological capabilities. The research was able to demonstrate that China has significantly increased its spendings on R&D, outspending Japan, Germany, South Korea and France combined. While China ranked in 9th place of countries with the highest spendings on R&D in 1991 they now find themselves slightly behind the United States. The average R&D investment per company has grown significantly in China, from €47.2 million in 2010 to €274.4 million in 2019 which is an overall growth of 447.1%. China's R&D expenditures also witnessed a more than 35-fold increase from 1991 to 2018 – from $13.1 billion to $462.6 billion. From 2019 to 2020 China's total expenditures on R&D rose by 10.3% in one year. China outranks EU companies investing in R&D

by scoring the 3rd place (+20,1%) of top 20 R&D Spenders of 2019. In comparison EU based increased R&D spending by merely 5.6%. The trend over the last ten years demonstrates the high priority R&D has received by the Chinese government. An interesting observation in this field is that China has increased its allocations of financial resources to precisely four key strategic industries, investing the most into ICT producers (30%) and ICT services (17.5%). China significantly outspends the EU in key technolgies where ICT producers make up half of Chineses spendings with 14.2% and ICT services 7% of investments in 2019. The EU, meanwhile, has been consistently investing the most R&D into the automotive industry (34.8%). China's increased focus on R&D has increased their output of intangible ideas and intellectual property, resulting in tangible technological capabilities.

Intellectual Property Rights

The research reflects a similar trend within the field of IPR over the last ten years. China's State-driven approach in an effort to become the leading country in the development, production and exportation of high-tech in key industries has contributed to significant IPR accumulation. This accumulation has occurred in various ways: Investments in European enterprises and research and development companies, through European Investments in Chinese companies, that in exchange require transfers of IPR, through M&A, through increased investments into R&D as well as through illegal obtainment of intellectual property. In an effort to make the contribution of IP to the accumulation of technological capabilities tangible this research analyzed the patents filed by both countries over the last decade. The analysis demonstrated that the choice of database plays a significant role here. The European Patent Office showed China had filed fewer applications than the database of the World Intellectual Property Organization. In 2020, the EPO registred 7% of patents (12,618) were filed by China (+9.9% increase from 2019) with the most patents filed by Huawei (3,113). The data by the WIPO demonstrates that the long-term trend reflects a significant increase in Chinese patents (1,542,002) filed, with an annual growth rate of 11.6% in 2018, equalling a share of 46,6% of all patents filed that year worldwide. Furthermore, the author was able to demonstrate that the same trend can be observed within China where patents are registered by the State Intellectual Property Office. In 2019 the CNIPA received 1.4 million applications which is more than the United States filed that year. Since 2011 China has consistently claimed the top spot of most patents filed worldwide, which is reflected in their share of world total (%), peaking in 2018 at 46.8% of the world patents filed. Once again the observation can be made that the majority of patents filed by China are within strategic technologies.

The research was also able to demonstrate that China employs different questionable strategies to obtain Intellectual Property produced by European companies. According to the author's calculations of the compiled data by the European Union Taxation and Customs Union from 2007 – 2018 China, the predominate perpetrator of IPR infringements, has consistently been producing over 50% of infringed IPR articles contained at the border. IPR infringements in articles that could be attributed to China peaked in 2010. That year of all the articles confiscated by customs 84.92% were from mainland China, amounting to 87,728,243 articles in total. After a slight decrease in IPR infringements perpetrated by China they peaked again in 2014 (80.08%) and in 2016 (80.65%). When calculating the mean of an eleven-year span from 2007 to 2018, 79.02% of IPR infringements in articles can be attributed to China. IPR infringements committed by China by articles consistently stay above 50% of total articles. The European Union struggles to implement an effective defensive mechanism in this field. While the EU fails to protect its intellectual property, China has put in place new export control regulations that prohibit the export of technological intangibles from key strategic industries – even if this IPR was produced by a European company operating on Chinese soil. The research was able to demonstrate that this presents a grave threat to the EU because over the last ten years many European manufacturers have not only moved their production sites to China but some of their R&D sites as well. China is prohibiting the export of intangibles these sites produce. The EU, once again, has only observed this action and has failed to take any countermeasures or issue any repercussions at this point in time.

Technical Standardisation

Technical Standardisation used to be a private industry-driven domain, which is still the case today in Europe. Yet, the compiled research was once again able to demonstrate that the process of technical standarisation is also a state-driven field for the PRC. The innovation policies put forth by China under Xi Jinping's leadership repeatedly oblige universities, think-tanks and enterprises to develop technical standards as well as to file a compulsory amount of applications annually at the International Organisation for Standardisation (ISO), the International Electrotechnical Commission (IEC) and the International Telecommunications Union (ITU). The research found that more than half of the proposed standards over the last ten years were proposed by China. China is flooding the ISO and IEC with proposals. In the last three years alone China proposed more than 20 standards all relating to key technologies (facial recognition, AI, surveillance technology). While the PRC focuses on a state-led approach, the EU and the USA still have a private entity led approach which has caused them to completely fall behind China. China's state-

led and financed approach to controlling technological capability standards inherently undermines the cooperative approach of this field.

Chinese influence can also be measured by the share of positions they hold within the ISO's and IEC's commitees and working groups. The analysis was able to demonstrate that China has increased its voice-opportunities within these organisations over the last decade. In a span of just seven years from 2011 till 2018 China's share of commitee positions in the ISO grew from 5% to 8.21%. In the same time span their shares in working groups rose from 2% to 6.58%. In the IEC European countries combined still hold the most secretariat positions: Germany holds the most overall (36) followed by France (22), UK (20) and Italy (13). Although China today still has less voice-opporutnities than the United States and Germany, the trend clearly demonstrates that they are in the process of closing this gap. The analysis highlights another interesting strategy China has employed to control high-tech standards, and with that, other countries' technological capabilities: Technical Standardisation export. China has not received the voice-options within the formal institutions that they desired which is why they now export their high-tech, automatically setting the new standard globally. The research was able to demonstrate that China has massively exported surveillance, GPS and AI technologies to 52 countries by 2019. By exporting technological standards China now controls 20% of the world's surveillance technology and 74% of the world's drone market – both operating on Chinese technological standards. The existence of a dual set of standards threatens to decouple the world into two camps, one with institutionally set standards and one with Chinese standards. The research shows that China has turned this seemingly underrated tool of standard setting into a tool of geopolitical conflict to achieve their political and economical goals internationally. China has turned this area into another battlefield for competition between the PRC and the EU. The EU has yet to increase its efforts in this field by failling to creat incentives for European companies to set standards and secure positions within these institutions. The EU must address this issue with the USA as well in an effort to increase the number of proposed standards and their number of seats distributed within the organisations.

4.3. Discussion

This research set out to demonstrate that China has increased its power and influence by accumulating high-tech capabilities in key strategic industries, hence, appearing increasingly threatening and as a rival to the EU. The results depict a clear picture of the strategies and methods

employed that have contributed to China's massive accumulation of technological capabilities. The author argues that controlling key technological capabilities in key sectors increases a state's overall power in the international system and presents one of the most important capabilities a state can acquire in the 21st century. The results demonstrate that China has been pursuing this strategy actively over the last ten years. On the political level China sets clear goals and pushes its own entities into the desired direction for favorable outcomes. China has been strategically acquiring technology overseas as this research has demonstrated. Although the EU has tried to counter individual action, for example, investments, mergers and acquistions and research and development, the EU lacks adequte and timely responses. The EU has meanwhile adopted a harsher tone with China, seemingly ending its naive stance on China. But the question remains whether the EU's countermeasures are effective enough and if they have been deployed too late. The author argues that although recent deterrence and countermeasures by the EU have been admirable, they are simply too late. The EU has suffered significant losses in key technologies and innovation gains, of which it is in many cases probably not aware of yet. China, in return, has accumulated technological capabilities for strategic industries. The author argues that regardless of the fact that technological capabilities have traditionally not received adequate attention, this paper has demonstrated the need for more research in this field. Technological gains equate to revenue, economic growth and job creation. Futhermore, technological gains can be directly facilitated from one's own military capacity, increasing a country's resources overall.

China, based on this research, has demonstrated an offensive and almost aggressive approach in its accumulation of technological capabilities through its acquistions of European intangibles, ideas and intellectual property. When setting China's behavior into a structural realism framework, China's approach seems to be an attempt to maximize its influence on its environment. The author argues that China displays behaviors of an influence-seeking state. First, China has increasingly been trying to maximize their voice opportunities in international organisations that set technological standards. As the previous section demonstrates, I was able to find evidence that China is actively pursuing obtaining seats within these organisations, as well as filing the most standards annually. Futhermore, China has a preference for international organisations in which it already has obtained the most voice-options. The author argues that although China does not hold international institutions controlled by the United States in high regard, China has created its own system of cooperation with the BRI in which it has the majority of voice-options and power over its financially dependent members. Additionally, China favors bilateral arrangements and the 17+1 cooperation because China also wields the greatest power and receives the most voice-

opportunities within these. While the EU seeks to establish a level playing field based on democratic values und ideals, China can use its own established forums with weaker countries to its advantage. These countries – some of them being EU Member States - welcome Chinese capital and, presumably knowingly, accept Chinese influence because the investments do not come with the same strings attached as money from the EU or the United States does. China has established cooperation with weaker states and we can expect to see China increase the dependencies of these weaker states as well.

Simultaneously, China displays behaviors of an autonomy-seeking actor. China in the past has not complied with existing obligations from bilateral and multilateral agreements, even with those agreements signed with the EU. For this reason it will remain interesting to see if China follows the newly signed agreement on comprehensive investments with the EU, or if they will find reasons to avoid their obligations. Furthermore, the argument can also be made that China has formed the BRI cooperation and 17+1 forum not only in an effort to accumulate technological capabilities and increase their influence, but also in an attempt to form an alliance against the United States and the existing world order. Herefore, China is willing to accept minimum losses of its autonomy. Although, it is doubtful if this part of the theory really applies to the Belt and Road Initiative considering that these countries are mostly weaker and have become increasingly dependent on China.

5. The Future of EU-China relations: Policy Options

5.1. Engagement

Mounting tensions between the United States and China make it increasingly challenging for the EU to maintain a comprehensive policy agenda on China. While the United States has been very vocal in addressing aggressive and unfair strategies which China favors on multiple policy levels, the EU has just recently adopted a more realistic policy stance, developing and implementing tools of defence. The EU can pursue the following options when engaging with China.
For one, the EU can continue to engage with China in the same matter it has for the last decades. Although, one could argue that EU liberalist policies allowing for a heightened access to EU

markets have backfired and created an asymmetrical relation with China. The EU is well advised to continue the realist defensive stance it adopted with its 2019 plan. The EU should pursue a level playing field, based on fair and competitive market regulations. This includes the implementation of further defensive mechansims, such as compulsatory investment screening mechanisms, market access restrictions in critical fields (R&D, IPR), as well as tangible consequences for violating joint agreements. The question remains to what extent the EU should pursue this engagement. Although the intensity, frequency and institutionalisation of engagement can vary contingent on field cooperation, it should be based on common values and align with international regulations. Nevertheless, the danger persists that the EU may fail to implement coherent defensive counter and deterrent measures, resulting in being absorbed by China's overwhelming power. The United States is well underway to preventing exactly this from happening and is practically urging the EU to adopt a tougher stance against China. This paper has pointed out that this is a difficult endeavour since the 27 Member States themselves lack decisiveness as well as cohesiveness in their joint actions towards China.

5.2. Decoupling

The EU also has the option to pursue concrete decoupling strategies. Again, the extent and intensity of decoupling may vary determined by the sector. For example, the EU could pursue a decoupling in the field of innovation. Here, the EU could reconsider its long-standing and intensified R&D ties with China and pursue a consequent reverse of Chinese investments and acquisitions of R&D from European countries (Huotari *et. al.* 2021, 7ff.). The EU could pursue this same strategy in different areas. The EU could diversify its supply chain and manufacturing sites in an effort to decrease dependence on one single country. Futhermore, the EU, under pressure by the United States, is actively in the process of decoupling its ICT systems from China and preventing Chinese surveillance technology from entering Europe. In that sense, a total decoupling of one sector could protect the EU from unwanted Chinese interference.

Additionally, the EU has the option to pursue a full decoupling strategy on all levels: Macro level (political and financial decoupling), Trade level (supply chain and critical inputs), Innovation level (R&D and standard setting) and on Digital level (data governance, network equipment, ICTs). The implementation of such a strategy remains doubtful due to the high dependency of the EU on Chinese investments, critical materials and value chains. Pursuing a strategy of complete

decoupling would only increase the creation of a world divided into two blocks (Huotari *et. al.* 2021, 7ff.). With China's increasing influence and capital worldwide and the deterioration of the liberal world order a block under Chinese leadership may actually be appealing to more countries than expected. Decoupling would increase the security issues of both parties and has the potential to create open conflict. On the other hand, a positive effect decoupling may entail is the creation of a coalition strong enough to balance China. The United States is actively pursuing this strategy and is increasingly influencing EU policy makers in their relations with China. This question is, is it already too late for the EU to formulate their own strategy on China or has this decision already been made for them? Has the United States already determined, that they will not tolerate closer Sino-EU ties? Has China also already made the choice to decouple themselves from the international system as we know it and is well underway to establish its own system of international governance? Evidence for the latter is presented within this paper as well.

CONCLUSION

Having tested the claim that China's accumulation of innovative power gains, through the acquisition of technology within the EU, leads to developing a threat-driven attitude towards the most populous country has been confirmed. This dissertation employs extensive cutting edge data collection, an analytical framework as well as the-state-of-the-art comparative dimension of this research. The practical signficants of this research enables policy makers to devleop and deploy approptiate tools and polices in an attempt to deter and prevent technolgy acquisition from within the EU.

The author demonstrated how the accumulation of high-tech capabilities in key strategic industries contribute to political power gains in the 21st century race to technological hegemony. Futhermore, the research was able to show how a country's potential to create and acquire innovation and technological capabilities directly relates to the generation of jobs, revenue, increased exports and economic growth. When placing these behaviors into the framework of Structural Realism the research demonstrated that other countries may perceive these rapid gains and massive amounts of accumulated technological capabilities as a threat.

Futhermore, this paper was able to demonstrate the exact strategy China employs in their effort to acquire key technology from European companies. The author was able to demonstrate that China acquires European technology by means of its extensive investment strategy which, through mergers and acquisitions, foreign direct investment, research and development purchases, manages to acquire intangibles in the form of intellectual property. Moreover, the research demonstrated that this race to technological hegemony is a state-driven one. China has made the acquisition of key technology a top priority and has increased its efforts on all levels. Today, China files the most patents, sets the most standards and has acquired the most resources vital for the supply chain of technological advancements. China actively pursues voice-opportunities within existing international organisations while simultaneously establishing competing structures of global governance.

The research was able to identify the exact nature of Chinese interest. The author was able to observe that in recent years China were already focusing all their efforts on the acqusition of four key technologies in strategic fields. Through purchases, acquisitions and own research and development China has now become the leading supplier of these technologies as well, exporting the most high-tech goods and services – based on Chinese technical standardisations – world wide.

Although the EU has made repeated attempts to counter and deter Chinese investment policy and cohesive strategies, the author argues that these are not adequate, sufficient nor efficient enough to address the increasing threat China presents. The EU has yet to address the BRI and the 17+1 group likewise in a sufficient and effective manner. While some policies may have shown first effects in reversing the asymmetry in the relations with China, China has managed to counteract these strategies by swiftly adapting to the new playing field. Futhermore, China is clearly aware of the fact that the EU is highly dependent on the Chinese market, Chinese export and Chinese capital – some EU Member States extending not only their hand, but their whole arm.

By labelling China as a systemic rival, the EU adopted a much harsher tone towards China. Since then, the EU has been more vocal in addressing aggressive Chinese tactics and unfair trading practices, abuse of European generosity and the EU's open market access. Although it remains to be seen whether the EU will once and for all abandon its naive stance on China and adopt a more realistic stance. Although the author advises against the EU seeking out an open geopolitical confrontation, the EU is best advised to rally its allies, seek out new partners and finally defend itself and protect the people it serves.

China's recently released five-year plan reveals that Chinese ambitions have yet to be satisfied. China will continue to seek out means and capabilities to increase its influence and enhance its power position within the global order. The paper was able to find evidence for an active decoupling already on the way – with numerous parties interested in participating in a new world order that is based on Chinese techno-authoritarianism.

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APPENDICES

Appendix 1. Many firsts in the EU-China Relations

1998	2 April	1st EU-Summit, London UK
1998	22 December	1st Agreement on Cooperation in Science and Technology
2003	30 October	1st Environmental Policy Dialogue (EPD)
2005	20 December	1st EU-China Strategic Dialogue, London, UK
2006	30 March	1st EU-China bilateral consolations under the Climate Change Partnership
2006	30 March	1st EU-China Dialogue on Agriculture
2007	22 June	1st Meeting of the EU-China Civil Society Round Table
2008	25 April	1st EU-China High Level Economic and Trade Dialogue
2012	19-20 September	1st EU-China Mayors Forum
2014	6 March	1st Dialogue on International Development
2014	31 March	1st visit by Chinese President Xi Jinping to Brussels
2016	20-22 January	1st Meeting of the Working Group on the EU-China Connectivity Platform
2016	6 April	1st EU-China Agenda 2020 Implementation Review
2016	21-22 June	1st Legal Affairs Dialogue

Source: European Commission 2017, author's summary of Main first Events

Appendix 2. IPR Infringements in the EU 2007 – 2018

IPR Infrigments in the EU 2007 - 2018					
	Total Cases	**Articles**	**Domestic retail value (EUR)**	**China by articles in % from total articles**	**China by value in % from total domestic retail value**
2007	43 671	79 076 458	Not registered	57.92%	Not registered
2008	49 381	178 908 278	Not registered	54.57%	Not registered
2009	43 572	117 959 928	Not registered	64.40%	Not registered
2010	79 112	103 306 928	1 110 052 402	84.92%	72.91%
2011	91 245	114 772 812	1 272 354 795	72.95%	70.93%
2012	90 473	39 917 445	896 891 786	64.51%	77.09%
2013	86 854	35 940 294	768 227 929	66.12%	72.43%
2014	95 194	35 568 982	617 046 337	80.08%	66.42%
2015	81 098	40 728 675	642 108 323	41.08%	58.37%
2016	63 184	41 387 132	672 899 102	80.65%	77.21%
2017	57 433	31 410	582 456 067	73.04%	37.73%
2018	69 354	26 720 827	738 125 867	50.55%	62.86%

Source: EU Taxation and Customs Union 2007 - 2018, author's analysis

Appendix 3. IPR Infringements by China: Articles

IPR Infrigments by China - Articles			
	Total Articles	**Articles by China in % from total articles**	**Articles by China in numbers**
2007	79 076 458	57.92%	45 801 369
2008	178 908 278	54.57%	97 630 247
2009	117 959 928	64.40%	75 966 194
2010	103 306 928	84.92%	87 728 243
2011	114 772 812	72.95%	83 669 380
2012	39 917 445	64.51%	25 750 744
2013	35 940 294	66.12%	23 796 069
2014	35 568 982	80.08%	28 483 641
2015	40 728 675	41.08%	16 731 340
2016	41 387 132	80.65%	33 378 722
2017	31 410	73.04%	22 942
2018	26 720 827	50.55%	13 507 378

Source: EU Taxation and Customs Union 2007 - 2018, author's analysis

Appendix 4. IPR Infringements by China: By Value

IPR Infrigments by China - Value			
	Domestic Retail Value (EUR)	**China by value in % from total domestic retail value**	**Retail Value of Chinese IP (EUR)**
2007	Not registered	Not registered	Not registered
2008	Not registered	Not registered	Not registered
2009	Not registered	Not registered	Not registered
2010	1 110 052 402	72.91%	809 339 206
2011	1 272 354 795	70.93%	902 481 256
2012	896 891 786	77.09%	691 413 878
2013	768 227 929	72.43%	556 427 489
2014	617 046 337	66.42%	409 842 177
2015	642 108 323	58.37%	374 798 628
2016	672 899 102	77.21%	519 545 397
2017	582 456 067	37.73%	219 760 674
2018	738 125 867	62.86%	463 985 919

Source: EU Taxation and Customs Union 2007 - 2018, author's analysis

Appendix 5. Export Control Law of the People's Republic of China

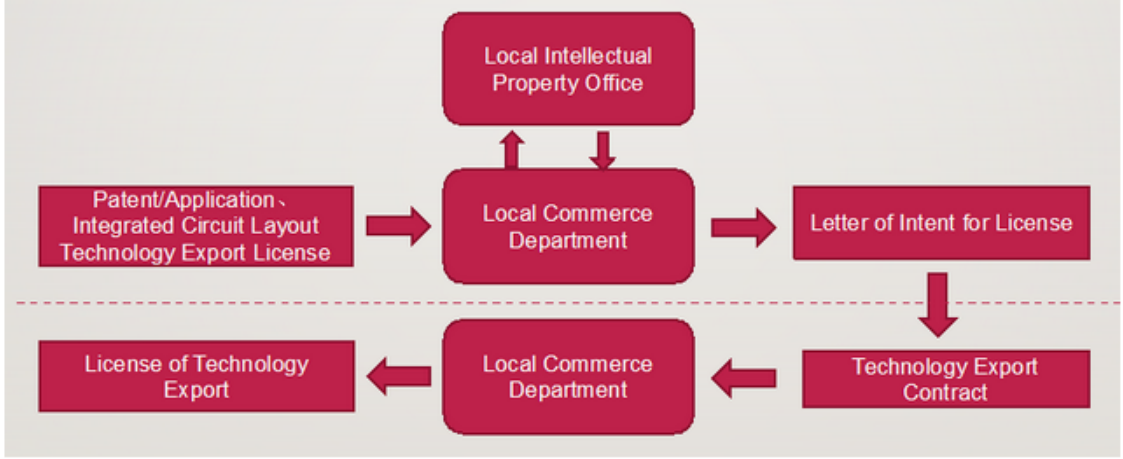
Export Control Law of the People's Republic of China

Effective December 1, 2020

ARTICLE 2	Defines **controlled items** to include dual-use items, military items, nuclear items and other goods, technologies, services and items relating to the maintenance of national security and national interests, and performance of nonproliferation and other international obligations
ARTICLE 3	Defines **transfer** to include any transaction outside the PRC and involving foreign organizations or individuals (implying it includes transactions in China that involve foreign entities)
ARTICLE 4	Defines **control list** to include lists, catalogues, and directories
ARTICLE 5	Defines **export control authorities** to include a consultative mechanism of State Council and Central Military Commission units that perform export control functions
ARTICLES 6 & 32	Call for **strengthening international cooperation and participating in global rules** related to export controls; cooperating and communicating with other countries and international organizations in accordance with international treaties concluded or ratified by China or on the **basis of principles of equality and reciprocity**
ARTICLE 7	Encourages companies to work through **industry groups and chambers of commerce** to perform export control duties
ARTICLES 8 & 9	Mention **both country and product list and determinations**
ARTICLE 9	Allows for **temporary controls** (up to 2 years in duration) for **products not on a control list**
ARTICLES 12 & 13	State that **license decisions** will consider **national security and the national interest**. Other factors include: international commitments; type of export; sensitivity of the items; destination country or region of the export; end users and end use; **credit record** of the entities; and **other factors** provided in China's laws and administrative regulations
ARTICLE 14	Includes provisions for **internal compliance systems** and **general licenses**
ARTICLE 16	Includes provisions for end-users and end-user; includes **restrictions on altering end-use**
ARTICLES 34-40	Outline **fines and actions** in response to various types of violations
ARTICLE 44	Scopes jurisdiction to include **transfers that occur outside of China**
ARTICLE 45	Addresses trade and transfer via **China's bonded zones**
ARTICLE 48	Provides justification for **tit-for-tat retaliatory action**: *"If any country or region abuses export control measures to endanger the national security and national interests of the People's Republic of China, the People's Republic of China may, based on the actual situation, take reciprocal measures against that country or region."*

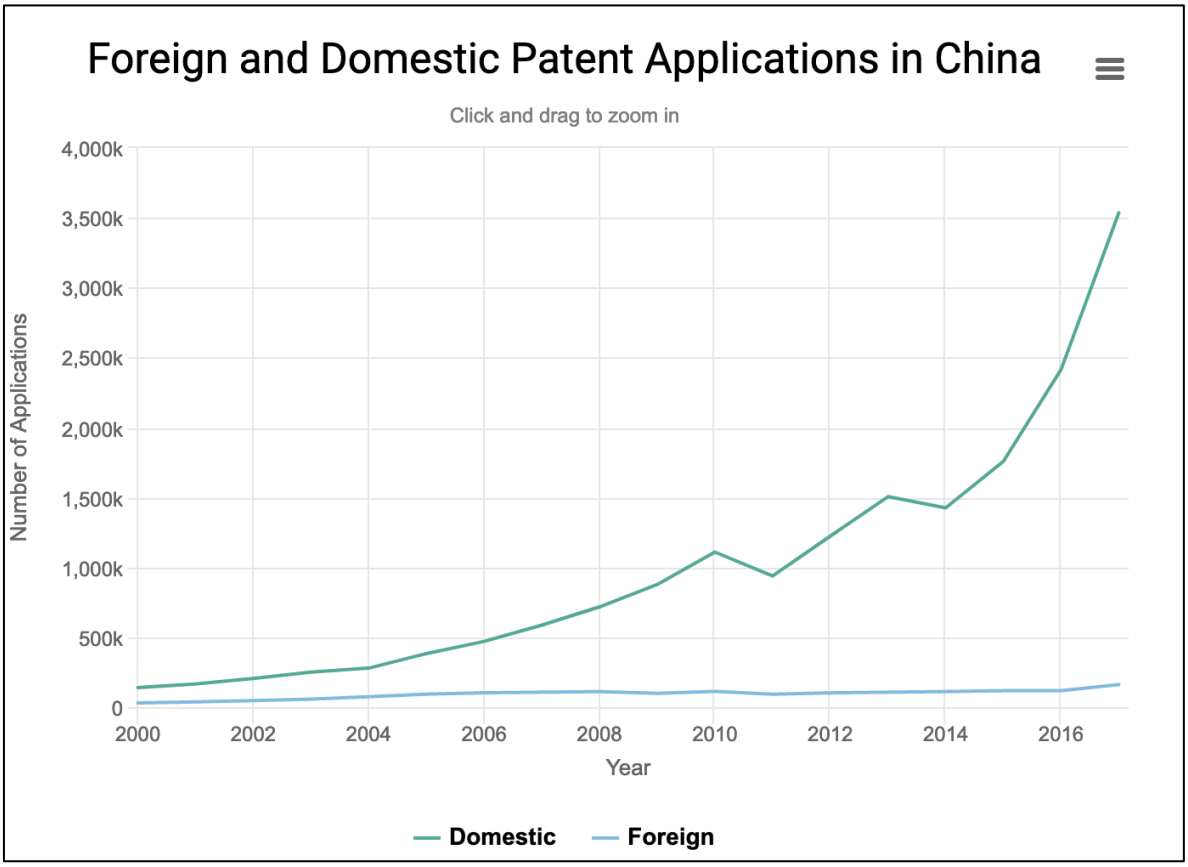
Source: Sutter 2020, 3f., depection by Sutter K. (2020)

Appendix 6. Measures for Transferring abroad Intellectual Property Rights



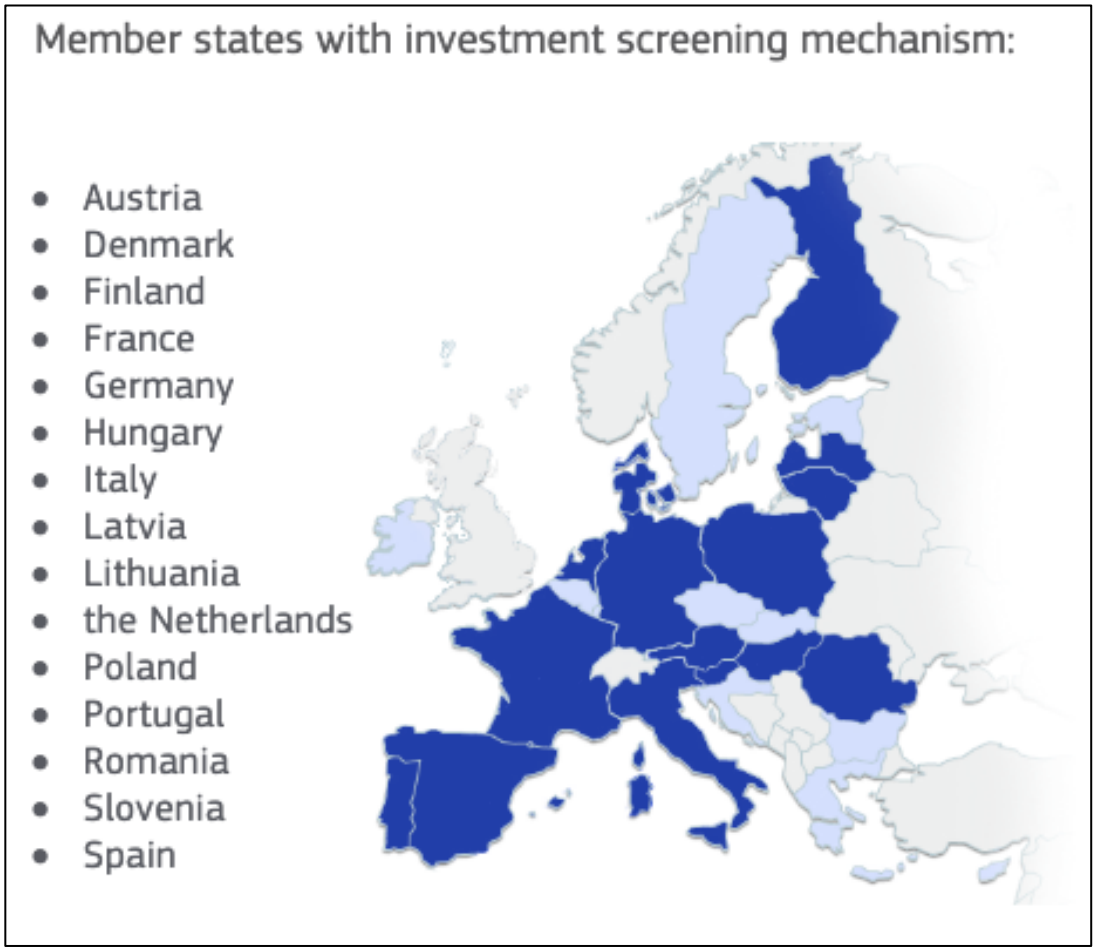
Source: China's Technology Import and Export Control Regime 2020, depiction by Song D. (2020)

Appendix 7. Foreign and Domestic Patent Applications in China



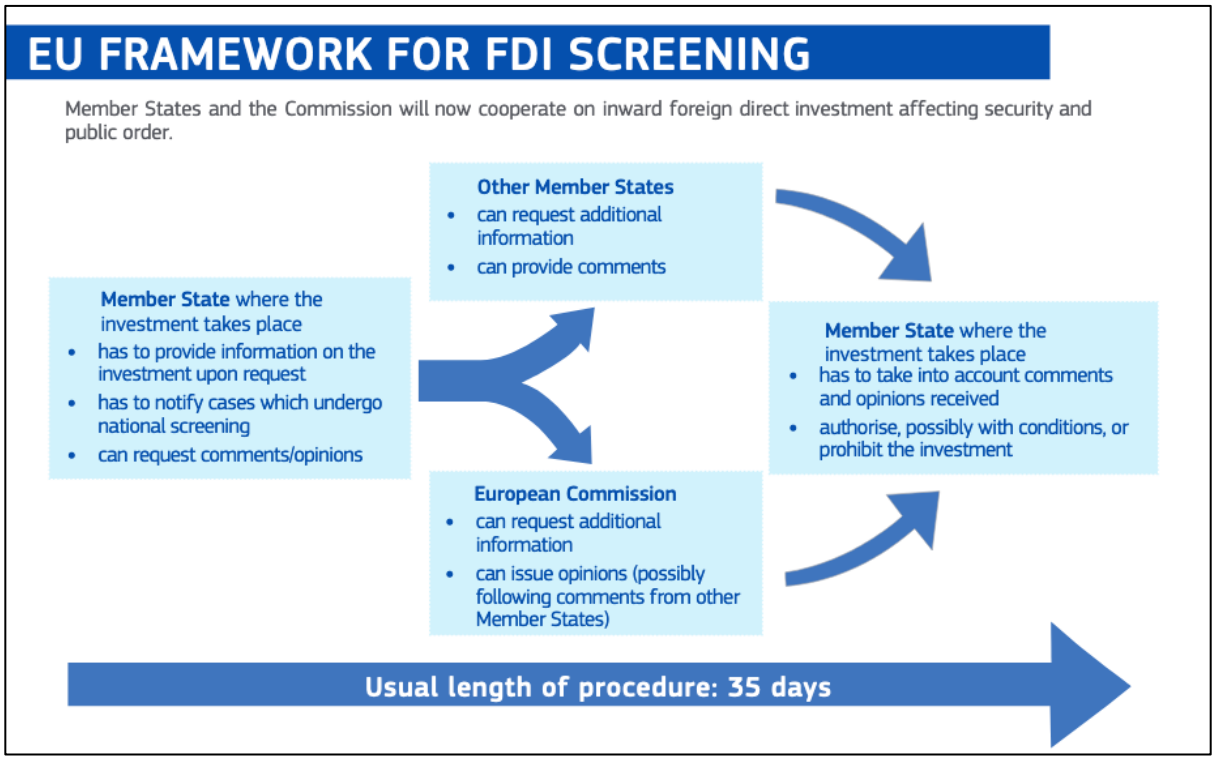
Source: China Power Team (2020). Are Patents Indicative of Chinese Innovation?, depiction (China Power Team 2020, 1).

Appendix 8. EU Member States with investment screening mechanism



Source: Foreign Direct Investment EU Screening Framework (EC 2020, 1), depiction by EC (EC 2020c, 1).

Appendix 9. EU Frame work for FDI Screening



Source: Foreign Direct Investment EU Screening Framework (EC 2020, 3), depiction by EC (EC 2020c, 3).

Appendix 10. Outward FDI flows by China to EU Member States

Location	2013	2014	2015	2016	2017	2018	2019
Austria	-584.10	-229.53	140.88	268.72	592.94	434.32	288.82
Belgium	..	..	..	-46.45	c	c	c
Czech Republic	24.11	48.07	0.12	-45.41	-32.82	13.99	9.45
Denmark	-22.25	-320.18	79.10	347.66	334.00	374.44	296.14
Estonia	0.14	-0.23	1.34	0.09	0.13	0.65	0.38
Finland	-1 043.41	-1 379.86	-539.10	109.48	213.05	68.45	26.87
France	2 232.84	1 934.46	826.40	593.83	851.09	774.22	157.84
Germany	12 516.61	11 384.82	6 079.70	8 429.05	7 019.48	4 068.64	3 774.83
Greece	1.33	-0.13	0.15	0.36	0.71	10.90	0.20
Hungary	-0.76	3.27	-3.38	7.88	3.29	-2.27	-1.58
Ireland	374.35	455.09	-22.18	c	c	c	c
Italy	535.05	-275.01	538.53	357.27	686.38	1 866.82	25.16
Latvia	0.00—	0.00—	0.00—	c	0.00—	0.00—	0.00—
Lithuania	1.78	..	..	..	20.76	0.87	-9.39
Luxembourg	3 938.67	-1 752.69	-84.30	1 239.63	-296.47	966.60	-2 123.59
Netherlands	833.66	1 166.25	1 536.33	990.82	909.71	621.98	2 012.71
Poland	22.53	0.67	-15.73	9.76	-7.20	6.48	-62.80
Portugal	-103.54	-35.82	5.55	8.85	-6.76	0.00—	-45.90
Slovak Republic	..	0.02	..	c	31.37	7.68	13.02
Slovenia	3.98	6.02	9.35	11.81	1.02	14.38	22.57
Spain	..	..	..	..	..	..	138.81
Sweden	1 919.85	962.84	1 934.44	711.15	671.70	-26.35	593.39

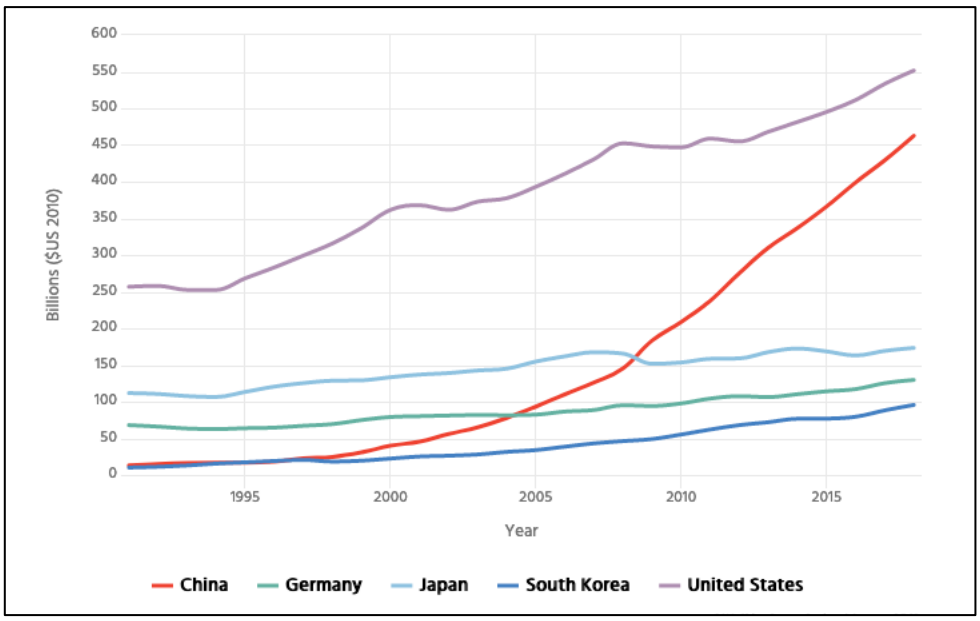
Source: Foreign direct investment: Financial flows by partner country (OECD 2020, 1), depiction OECD 2020 in Million US dollars

Appendix 11. The Top 20 R&D Spenders

		R&D Spending			
2019	Company	2019 (€ billion)	Change from 2018	Country	Industry
1	Alphabet	23.2	24%	United States	Software & Computer Services
2	Microsoft	17.2	14%	United States	Software & Computer Services
3	Huawei	16.7	31%	China	Technology Hardware & Equipment
4	Samsung	15.5	8%	S. Korea	Electronic & Electrical Equipment
5	Apple	14.4	14%	United States	Technology Hardware & Equipment
6	Volkswagen	14.3	5%	Germany	Automobiles & Parts
7	Facebook	12.1	32%	United States	Software & Computer Services
8	Intel	11.9	-1%	United States	Technology Hardware & Equipment
9	Roche	10.8	6%	Switzerland	Pharmaceuticals & Biotechnology
10	Johnson & Johnson	10.1	5%	United States	Pharmaceuticals & Biotechnology
11	Daimler	9.6	7%	Germany	Automobiles & Parts
12	Toyota Motor	9.1	6%	Japan	Automobiles & Parts
13	Merck U.S.	8.2	-4%	United States	Pharmaceuticals & Biotechnology
14	Novartis	7.7	-5%	Switzerland	Pharmaceuticals & Biotechnology
15	Gilead Sciences	7.4	98%	United States	Pharmaceuticals & Biotechnology
16	Pfizer	7.4	6%	United States	Pharmaceuticals & Biotechnology
17	Honda Motor	6.8	0%	Japan	Automobiles & Parts
18	Ford Motor	6.6	-10%	United States	Automobiles & Parts
19	BMW	6.4	-7%	Germany	Automobiles & Parts
20	Robert Bosch	6.2	1%	Germany	Automobiles & Parts
		221.6	**10.3%**		

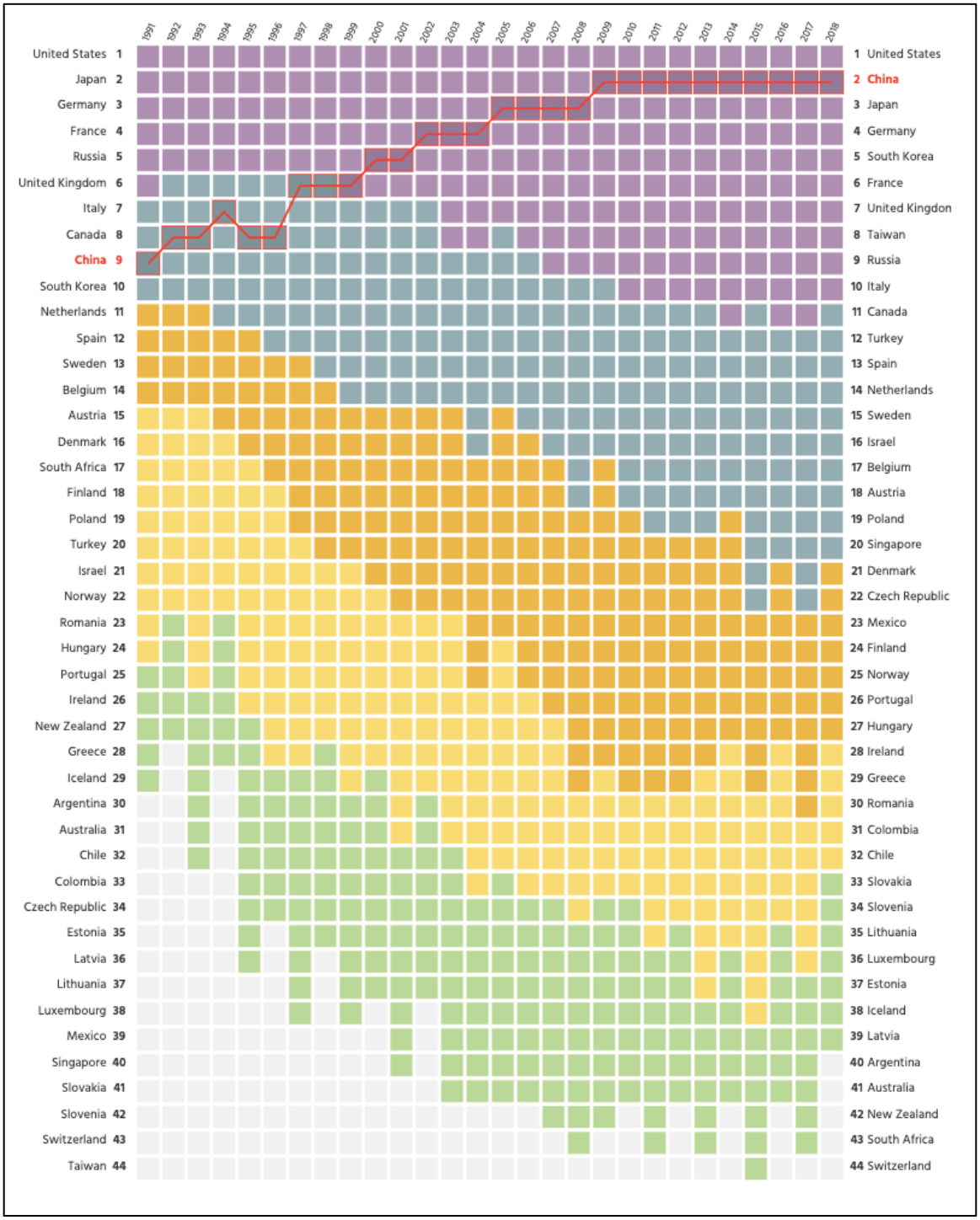
Source: Transatlantic Economy 2021: Annual Survey of Jobs, Trade and Investment between the United States and the EU, depiction by Hamilton, D. S. and Quinlan, J. P. (2021, 23).

Appendix 12. Gross Domestic Spending on R&D



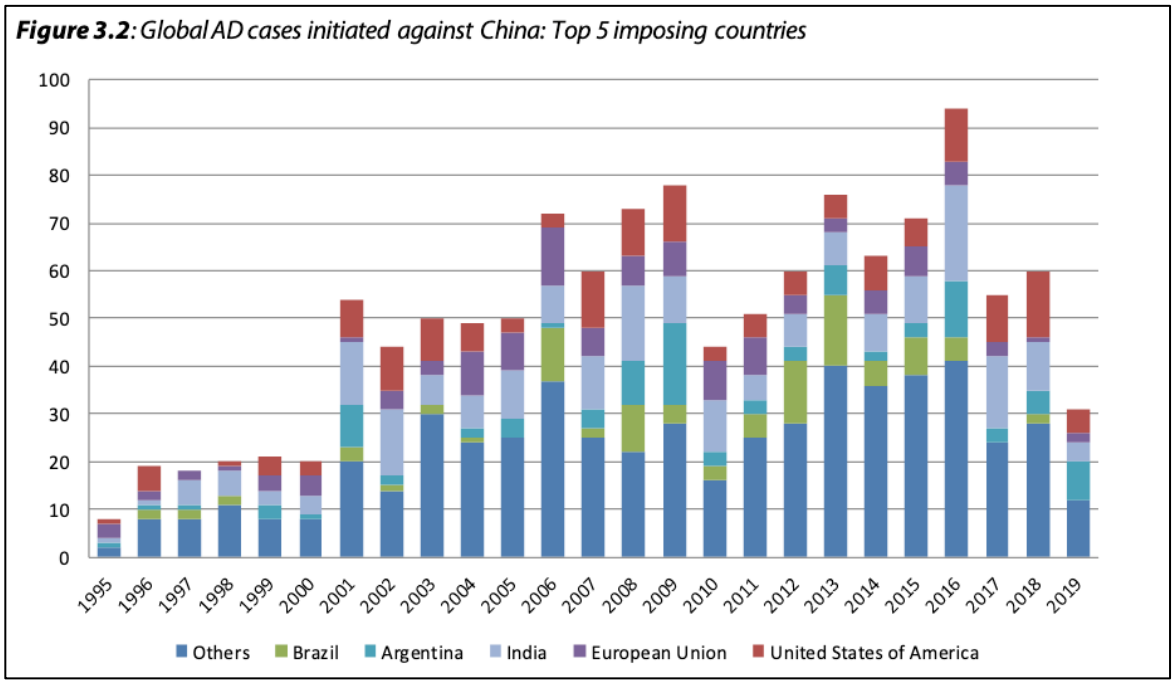
Source: Is China a Global Leader in Research and Development? (China Power Team 2018, 1), depiction by China Power Team (2018, 1)

Appendix 13. R&D spending Around the World



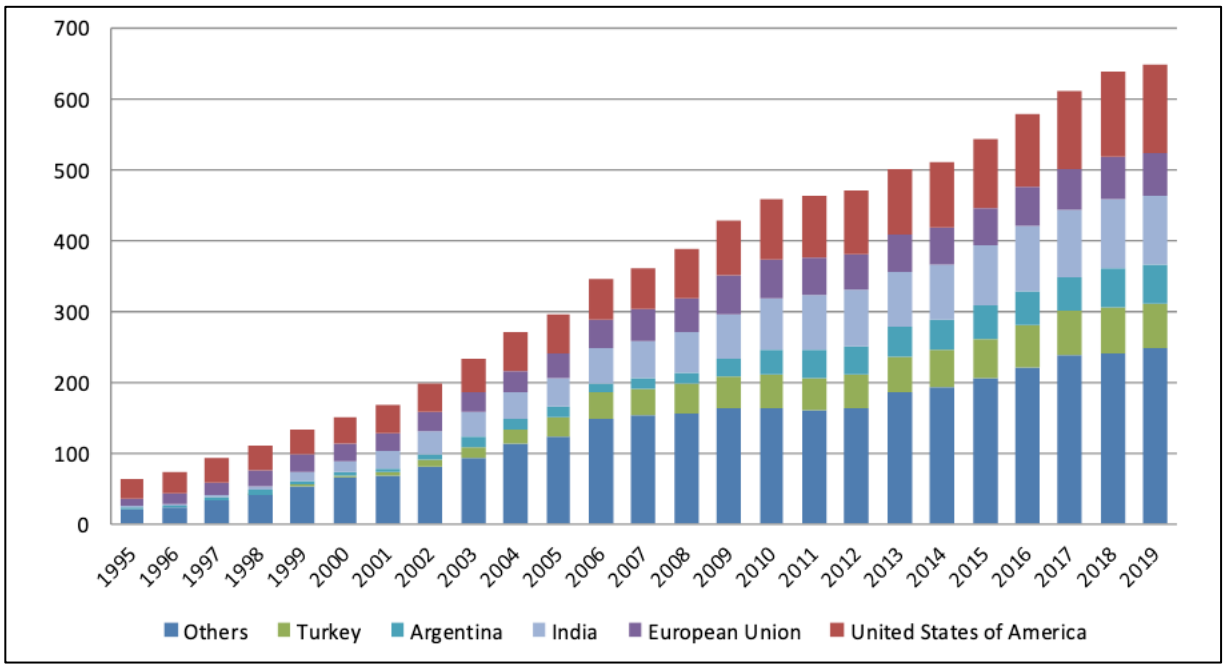
Source: OECD Main Science and Technology Indicators in "Is China a global leader in Research and Development (2018), depiction by China Power Team (2018, 1).

Appendix 14. Global AD cases initiated against China: Top 4 imposing countries



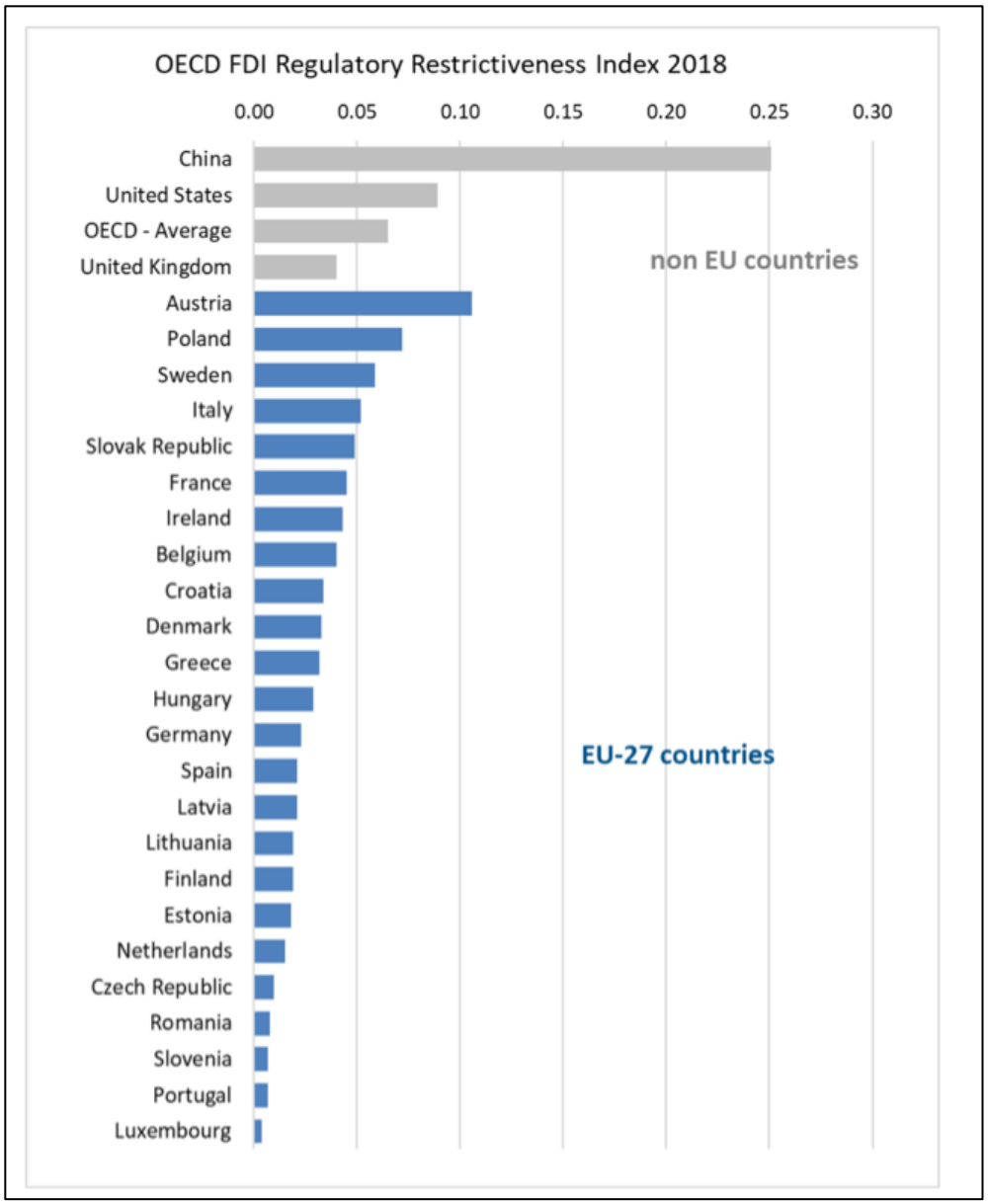
Source: Garcia-Herrero *et al.* 2020, 21, depiction (Garcia-Herrero *et al.* 2020, 21)

Appendix 15. Global AD measures in force against China: Top 5 imposing countries



Source: Garcia-Herrero *et al.* 2020, 22, depiction (Garcia-Herrero *et al.* 2020, 22)

Appendix 16. OECD Regulatory Restrictiveness Index 2018



Source: European Court of Auditors. 2020, 18, depiction (ECA 2020, 18)

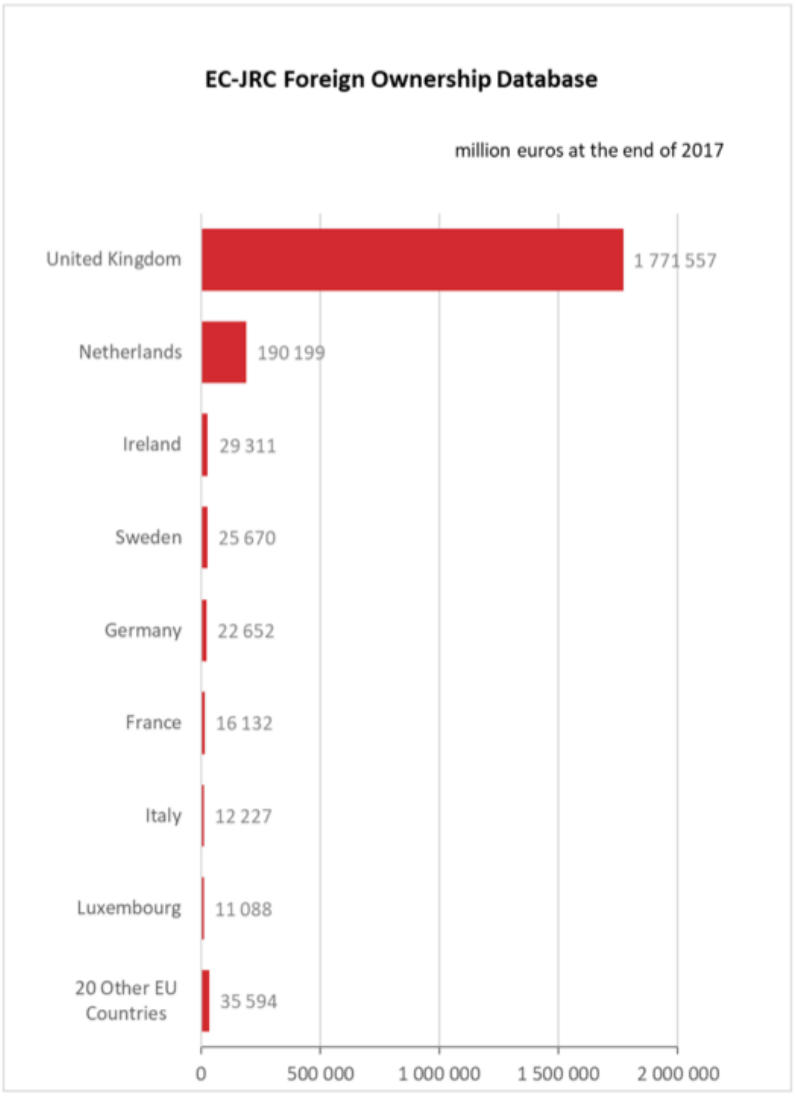
Appendix 17. Sectoral restrictions of foreign investments in China as compared to the EU

Sectors	Chinese Investment Regime vis-à-vis EU investors	EU Investment Regime vis-à-vis Chinese investors
Exploration & exploitation of oil and natural gas	Joint Venture only	No restrictions
Printing of publications	Minority only	No restrictions
Automobile manufacturing	Max 50 %	No restrictions
Repair, design & manufacturing of ships	Minority only	No restrictions
Aircraft design & production	Minority only	No restrictions
Production of satellite television broadcasting	Minority only	No restrictions
Nuclear power stations	Minority only	No restrictions
Construction & operation of power grids	Minority only	No restrictions
Construction & operation of network of railways	Minority only	No restrictions
Construction & operation of civil airports	Minority only	No restrictions
Telecommunication companies	Minority only	No restrictions
Banks	Max 20 %	No restrictions
Insurance companies	Max 50 %	No restrictions

Source: European Court of Auditors 2020, 19, depiction (ECA 2020, 19)

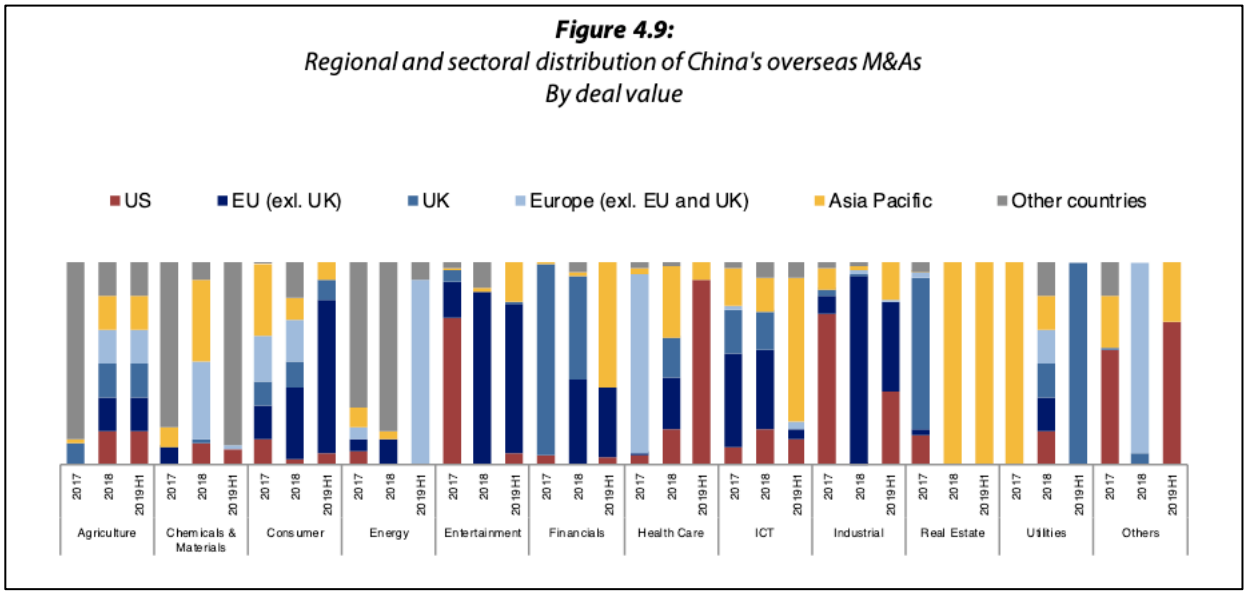
Appendix 18. Assets of companies in the EU controlled by Chinese investors according to the EC-JRC Foreign Ownership Database

Figure 14 – Assets of companies in the EU controlled by Chinese investors according to the EC-JRC Foreign Ownership Database



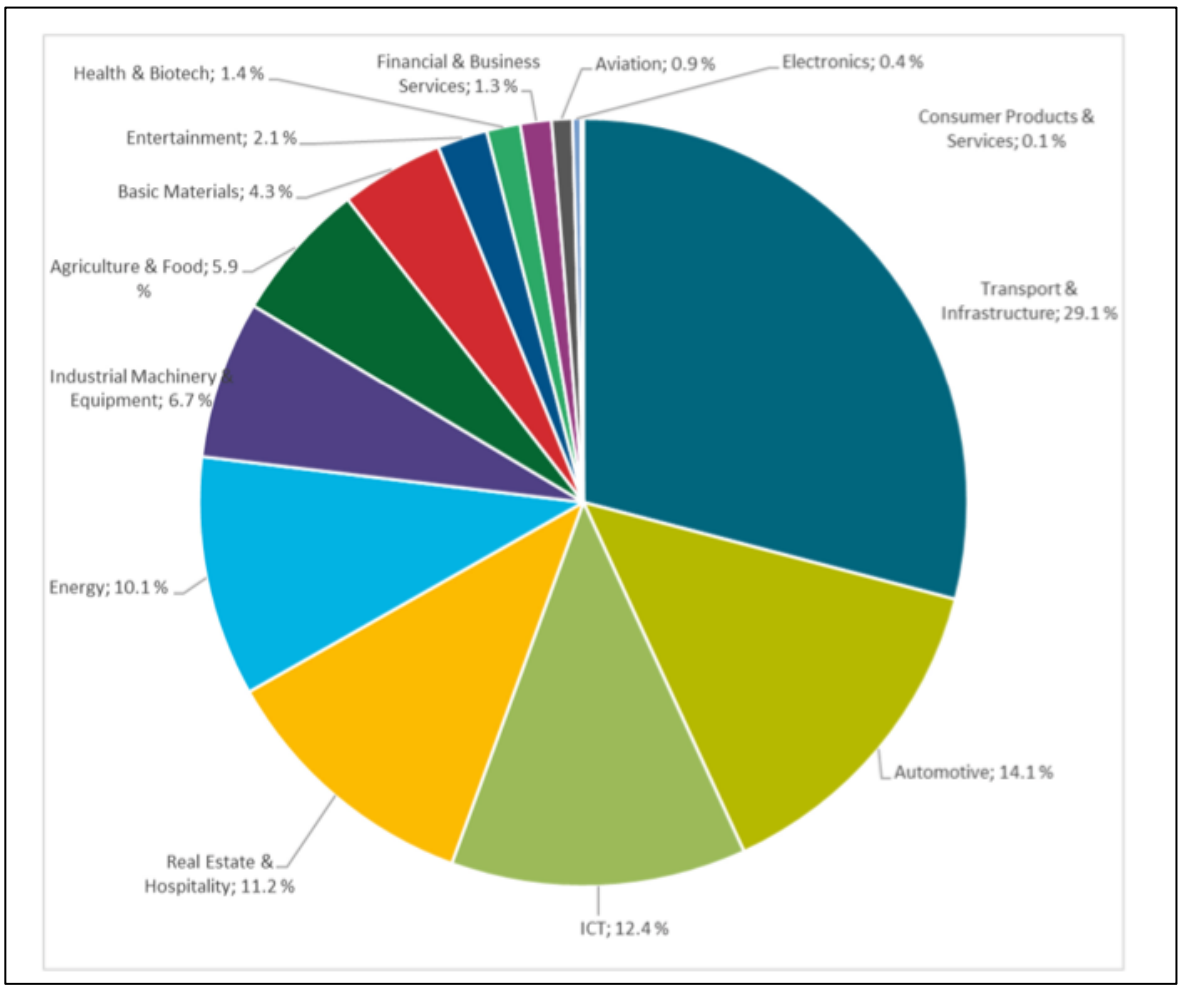
Source: EC-JRC Foreign Ownership Database, depiction by Rühlig 2020, 58

Appendix 19. Regional and sectoral distribution of China's overseas M&As by deal value



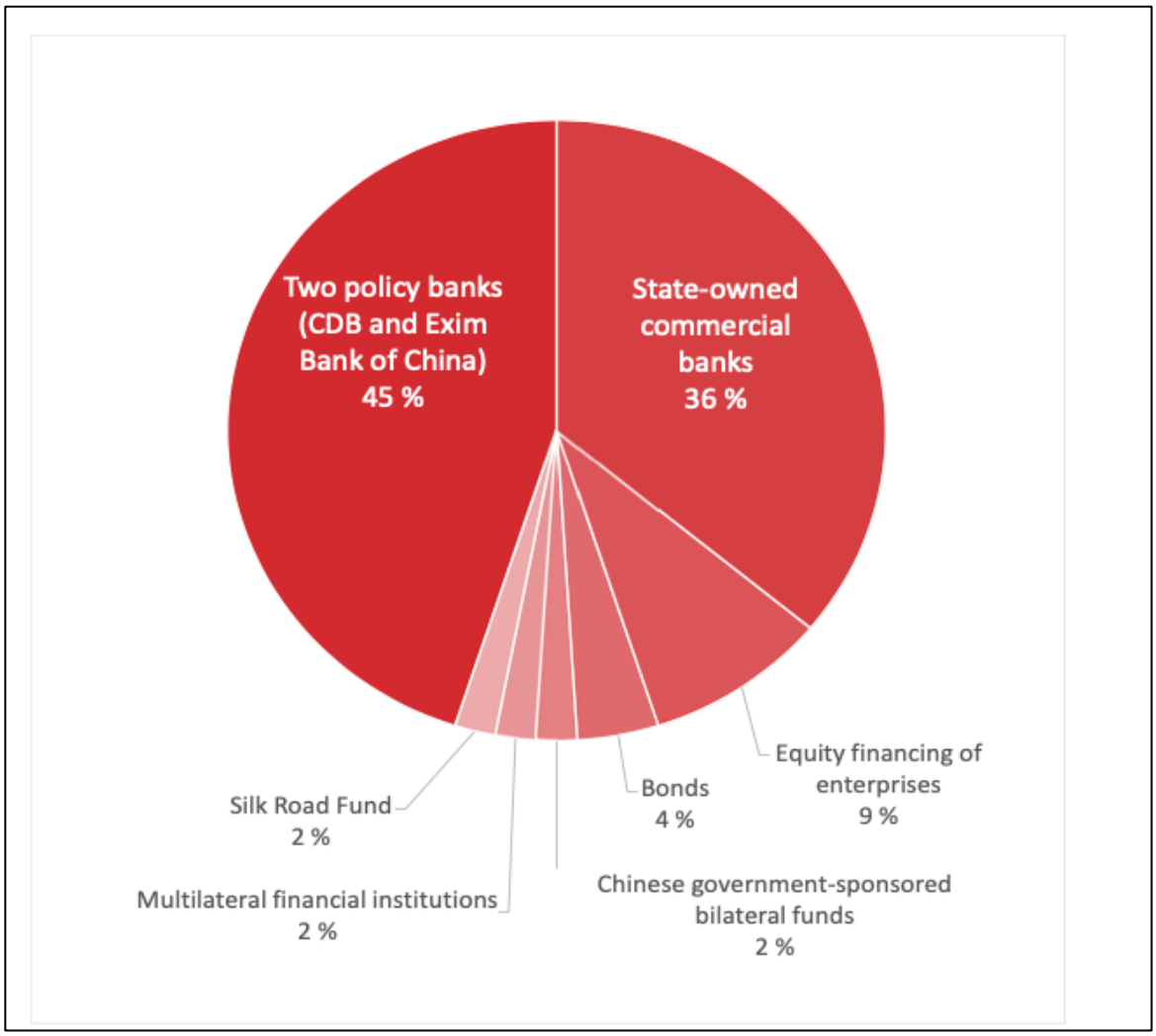
Source: Garcia-Herrero *et al.* 2020, 30, depiction (Garcia-Herrero *et al.* 2020, 30)

Appendix 20. Chinese FDI transactions in the EU by Chinese state-owned Investors 2000-2019, by sector



Source: Chinese FDI transactions in the EU by Chinese state-owned Investors, depiction by Rühlig 2020, 23.

Appendix 21. The sources of funding to support BRI projects



Source: The Sources of funding to support BRI projects, depeiction by Rühlig 2020, 55.

Appendix 22. Mineral commodities most frequently used in wind energy, photovoltaic or battery technologies

MINERAL COMMODITIES	USED IN	BIGGEST PRODUCERS
Beryllium	Wind energy	Brazil, China, Madagascar, Mozambique, Portugal
Cobalt	Batteries, energy storage, electric vehicles	The Congo, Biggest refiner China
Gallium	Solar power systems	Biggest refiner China
Germanium	Solar power systems, fiber-optic cables	Canada, China, Finland, the Congo
Indium	Solar power systems	China (50%), Belgium, Canada, Japan, South-Korea
Graphite	Battery technology, electric vehicles	China (67%), India, Brazil
Lithium	Battery technology	China, Australia
Niobium and Tantalum	Energy storage	Brazil (90%), Canada
Rare earth elements	Clean energy applications	China (90%), Australia
Selenium	Solar power systems	Japan (51%), Belgium, Canada, Japan and the United States
Tellurium	Solar power systems	China, Sweden
Vanadium	Battery technology	China, Russia, South Africa

Source: NATO Energy Security Centre of Excellence (2020, 28), depiction by NATO 2020, 28.

Appendix 23. What is the EU doing to connect Europe & Asia?

Source: EC 2018c, 2, depcition by EC 2018c, 2.

Appendix 24. The EU's most important Trade Partners

Die wichtigsten Handelspartner der Europäischen Union – Warenhandel 2019 (in Mio. EUR)

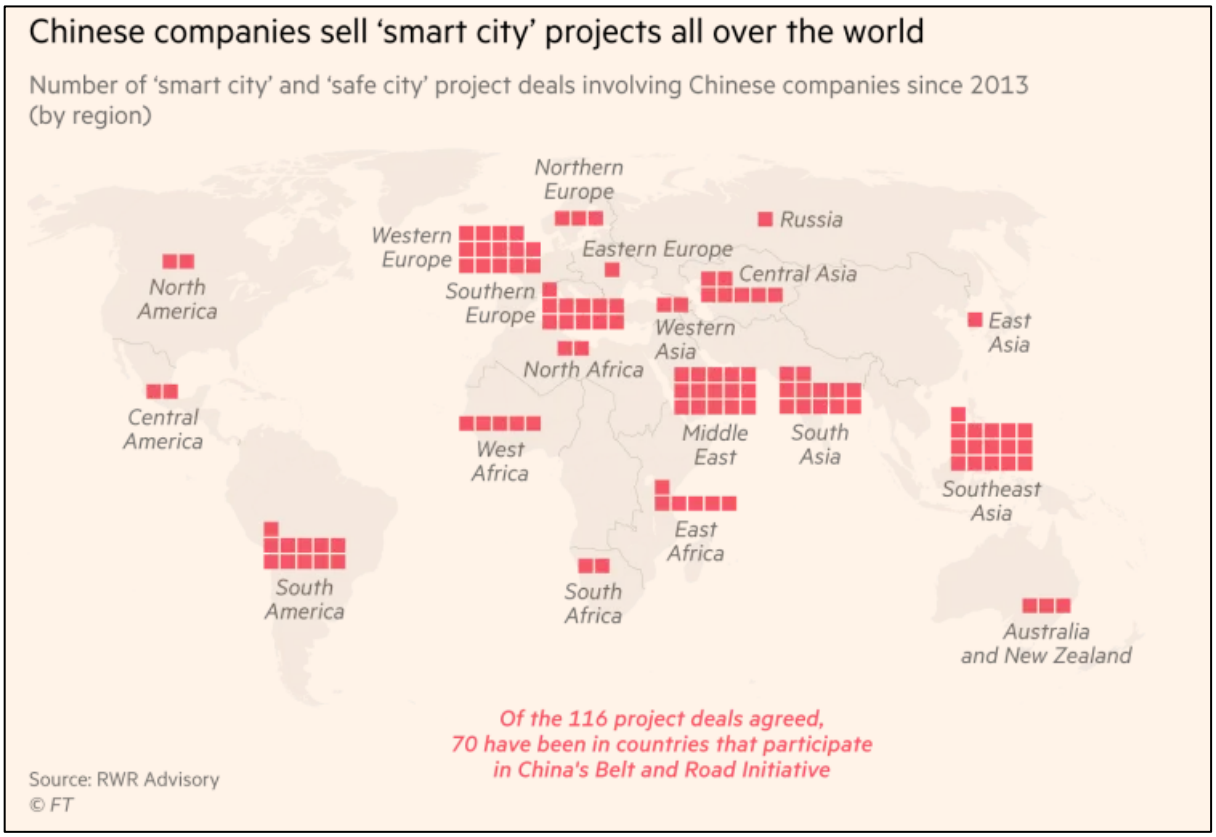
Land	Ausfuhren	Einfuhren	Gesamt	Handelsbilanz
USA	384 435	231 951	616 386	+152 484
China	198 290	361 855	560 146	-163 565
Vereinigtes Königreich	318 099	193 698	511 798	+124 401
Schweiz	146 775	110 261	257 036	+36 515
Welt	2 132 015	1 934 944	4 066 959	+197 071

Quelle: Europäische Kommission, 2020.

Source: European Parliament 2020

depiction by European Parliament 2020. (Ausfuhren = Exports, Einfuhren = Imports, Gesamt = Total, Handelsbilanz = Trade Balance)

Appendix 25. Chinese companies sell "smart city" projects all over the world

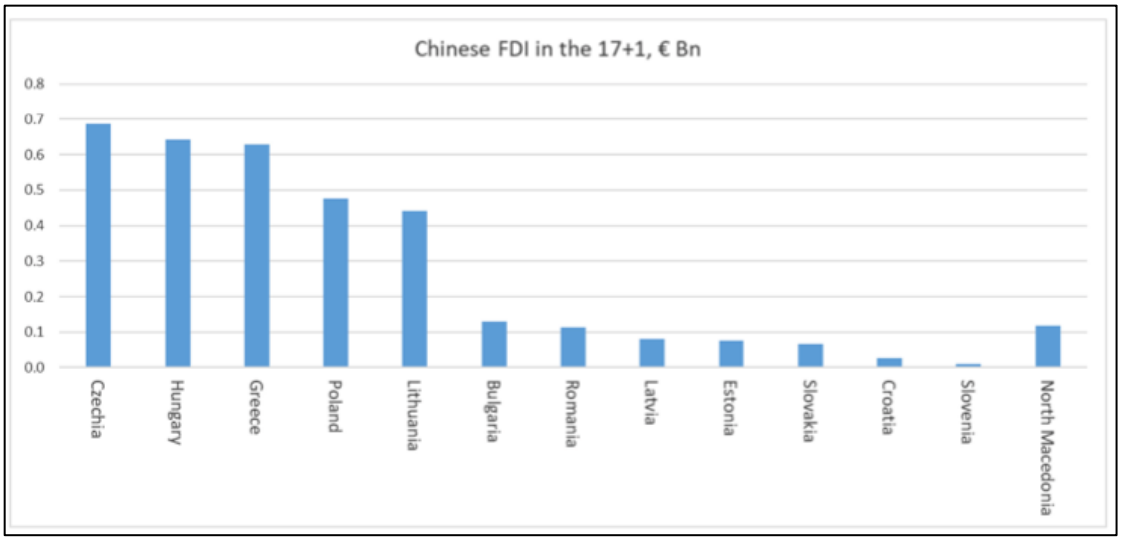


Source: Kynge; Liu 2020, 1; depiction by RWR Advisor in Kynge and Liu 2020

Appendix 26. Chinese share (in %) of leadership positions in ISO

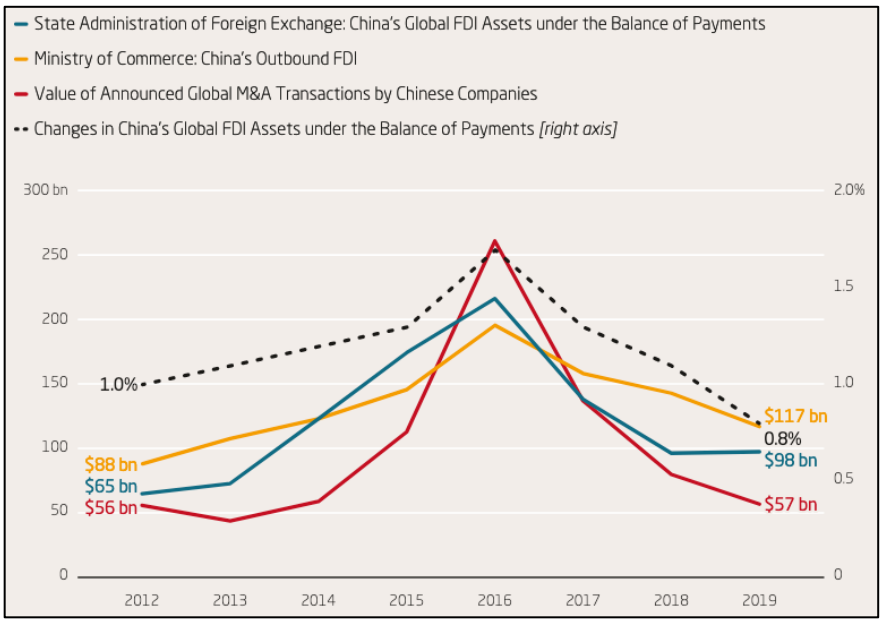
Source: Rühlig 2020, 22; depiction by Rühlig (Rühlig 2020, 22).

Appendix 27. Chinese FDIs (stock) in the CEEC at the end of 2017



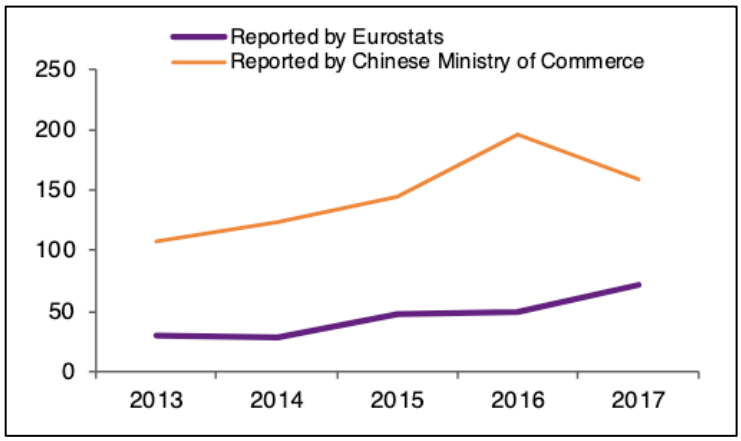
Source: Rühlig 2020, 43; depiction Rühlig 2020, 43.

Appendix 28. China's global outward FDI declined again in 2019 (USD billion, percent share)



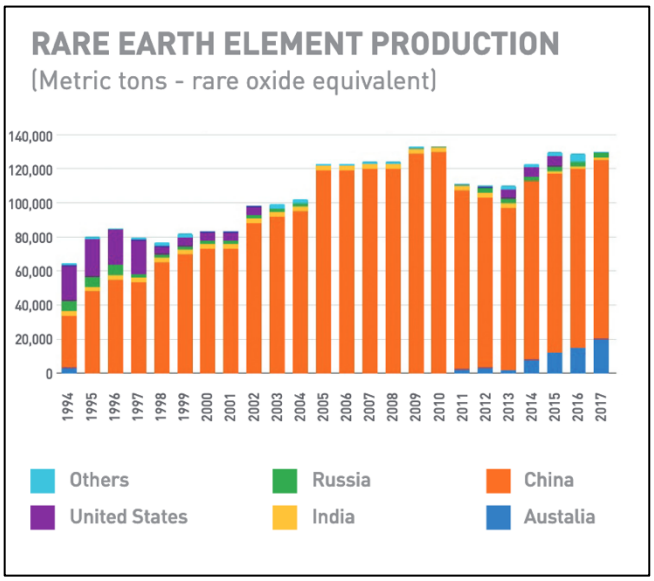
Source: Kratz *et. al.* 2020, 8.; depiction by Kratz *et. al.* 2020, 8.

Appendix 29. China's direct investment in the EU (USD bn)



Source: Garcia-Herrero *et al.* 2020, 30.depiction by Garcia-Herrero *et al.* 2020, 30.

Appendix 30. Rare Earth Element Production



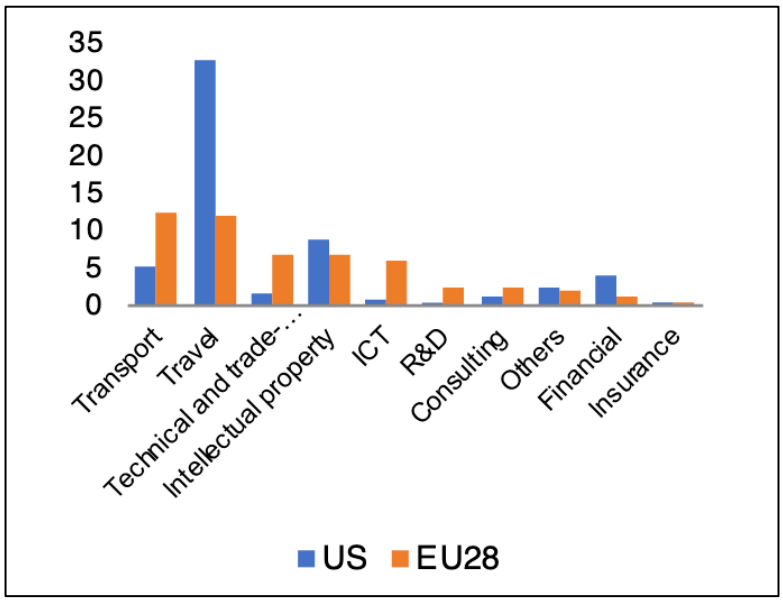
Source: NATO Energy Security Centre of Excellence 2020, 32; depiction NATO Energy Security Centre of Excellence 2020, 32

Appendix 31. Contribution of IPR-intensive industries to EU employment and GDP (2014 - 2016 average)

IP right	Direct employment	Share of total direct employment (%)	Direct & indirect employment	Share of total direct and indirect employment (%)	Value added / EU GDP (€ million)	Share of total EU GDP (%)
All-IPR industries	**62,962,766**	**29.2%**	**83,807,505**	**38.9%**	**6,551,768**	**44.8%**
Copyright-intensive industries	11,821,456	5.5%	15,358,044	7.1%	1,008,383	6.9%
Patent-intensive industries	23,571,234	10.9%	34,740,674	16.1%	2,353,560	16.1%
Plant variety-intensive industries	1,736,407	0.8%	2,618,502	1.2%	181,570	1.2%
Trade mark-intensive industries	46,700,950	21.7%	65,047,936	30.2%	5,447,857	37.3%
GI-intensive industries	n/a	n/a	399,324	0.2%	20,155	0.1%
Design-intensive industries	30,711,322	14.2%	45,073,288	20.9%	2,371,282	16.2%

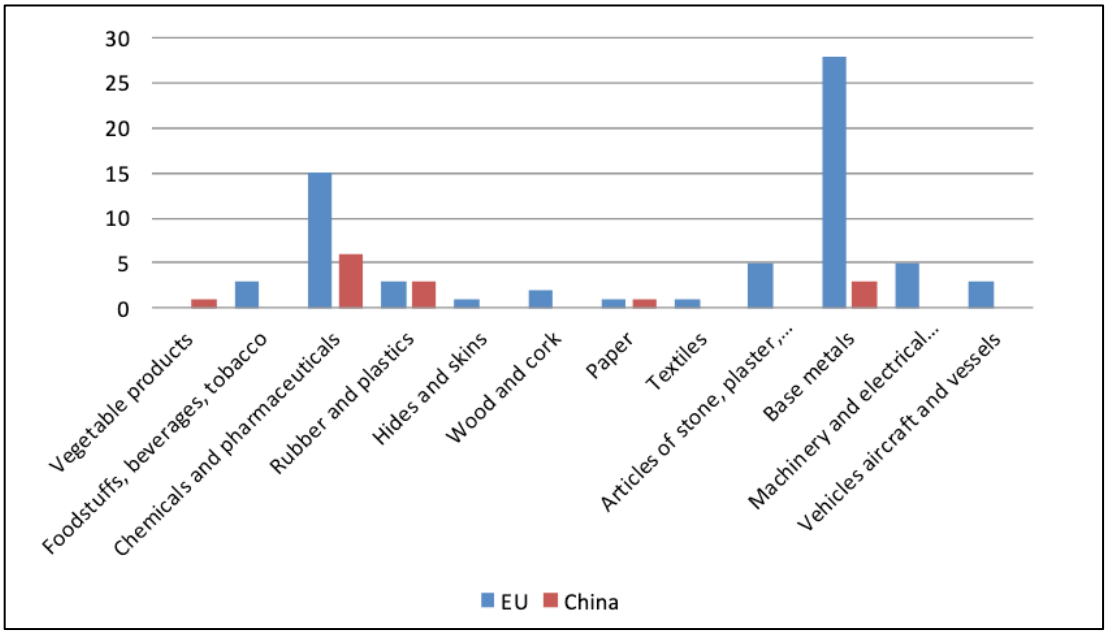
Source: EC (2020b, 4); EPO; EUIPO (2019, 7)

Appendix 32. The US and EU's service exports to China



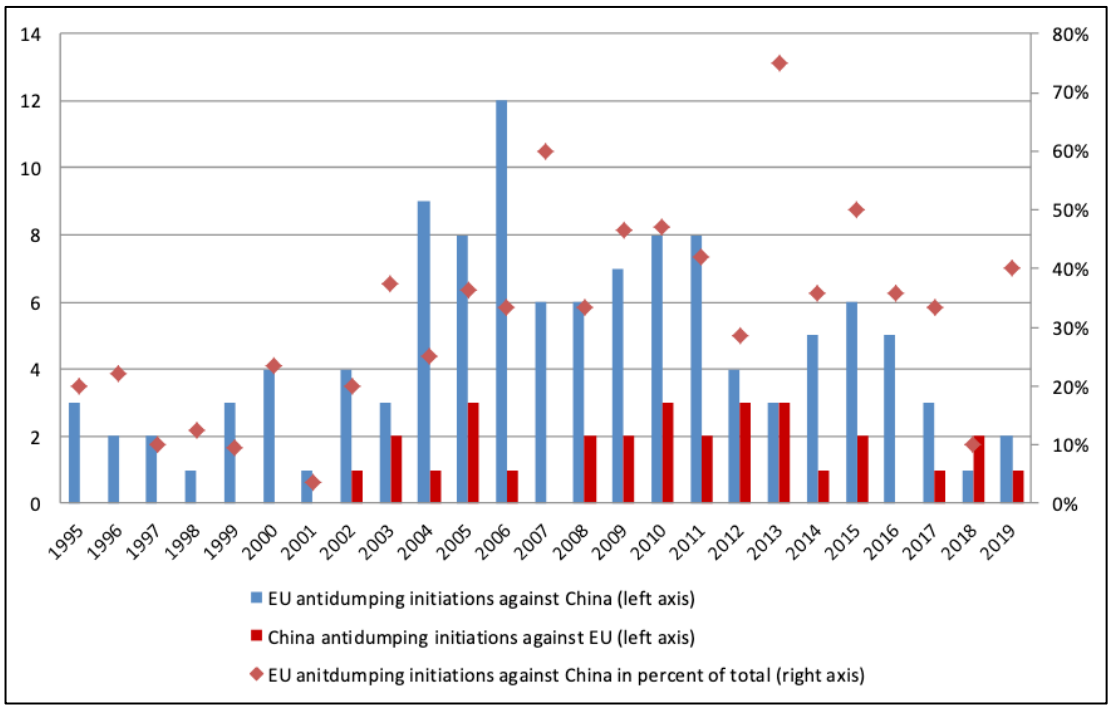
Source: OECD International Trade in service statistics; depiction by Garcia-Herrero *et al.* 2020, 18.

Appendix 33. EU AD measures in force against China and Chinese AD measures in force against the EU by sector in 2019



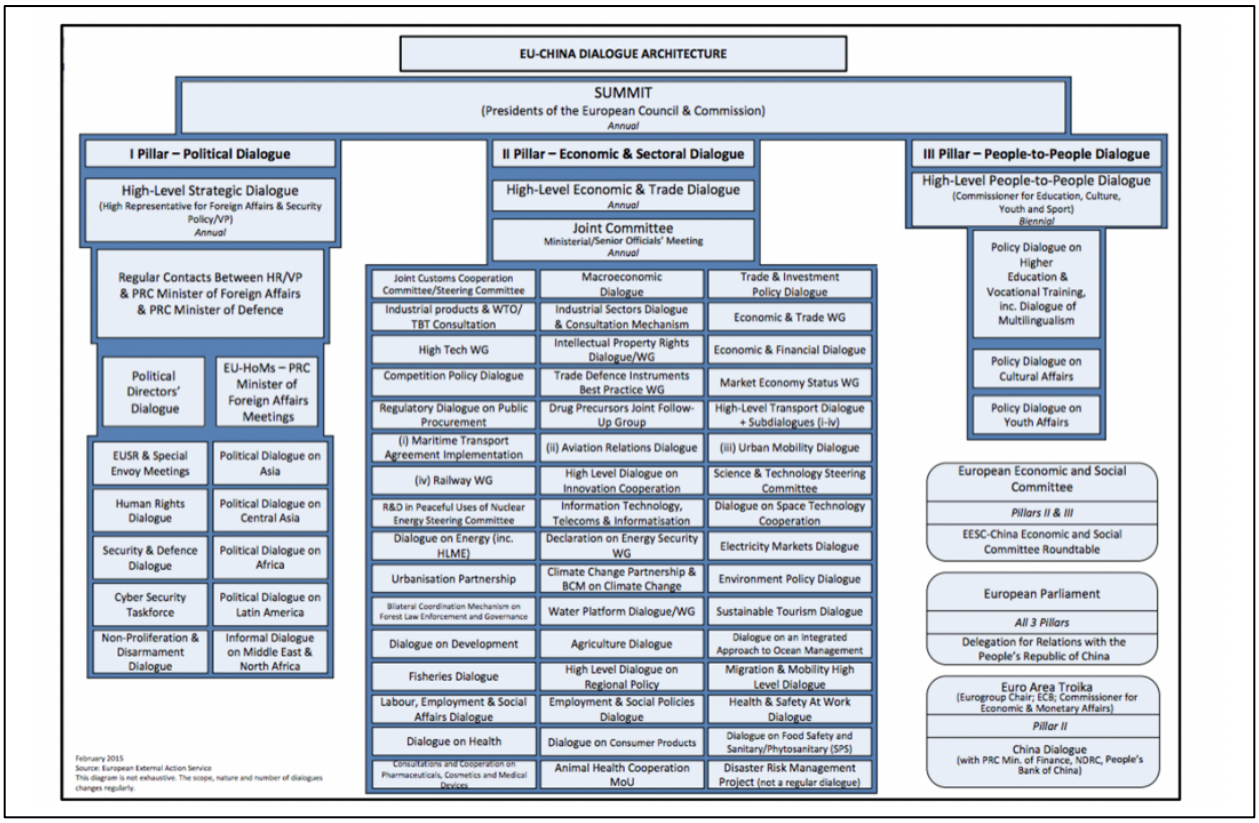
Source: Garcia-Herrero *et al.* 2020, 23; depiction Garcia-Herrero *et al.* 2020, 23

Appendix 34. EU AD initiations against China and Chinese AD initiations against the EU



Source: Garcia-Herrero *et al.* 2020, 20; depiction Garcia-Herrero *et al.* 2020, 20

Appendix 35. The Dialogue Architecture of China-EU Relations



Source: European External Action Service, 2015; depiction EEAS 2015

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