Introduction:

Nowadays, a world-changing transition is underway globally, one whose significance for the trajectory of humanity could rival the Industrial Revolution. This transition is driven by the switch from a fossil fuel-based economy to one driven by renewable energy and sustainable transport, through the proliferation of battery electric cars, or EVs short, and batteries. This transition is so significant because it changes the main energy source driving human civilization, namely fossil fuels, which are only there in limited quantities, to widely abundant clean energy that could prevent the dangerous consequences of global warming too. EVs and batteries could also be one of the, if not the major sectors of the economy of the future. Therefore, it is in the interest of each nation to pursue the development of an industry that can manufacture these products. The country that is currently leading in the manufacturing and proliferation of both these technologies in China. China is both the largest producer as well as the largest market for electric cars and batteries, and its companies in these sectors, such as CATL, have world-leading positions. However, the question is how exactly did this happen? How did a country that back in the 2000s did not have any electric car on its streets suddenly become dominant in this sector? The answer to that is political economy, or more accurately defined, China´s political-economic system of state capitalism, which allowed it to play out its institutional advantages to pursue policies such as subsidies, regulations, creating artificial demand, easing access to loans and access to land, and other support measures that would aid in the development of a domestic industry of electric cars. The central question, which is how China´s state-capitalist system impacted upon its leading role in electric car and battery manufacturing, will be answered in the following ways: First, there will be an analysis of the financial and other material support for Chinese electric car and battery firms, which will entail a description of how China uses access to easy loans or tax incentives to facilitate the growth of a domestic industry, or in some cases even partial ownership of EV start-ups by Chinese government entities. In the next chapter, the regulatory benefits for EV and battery companies from the Chinese state will be discussed. These benefits include giving companies access to cheap land and lax environmental or safety regulations, as well as using regulations that China´s EV makers will only get subsidies if they use domestically produced batteries. Next, policies that helped to solve the “chicken and egg problem” of creating demand for electric car chargers before there was supply will be analyzed. This will include a description of China´s incentive to create a charging station network before it made market sense, and also a brief description of policies that helped create artificial demand for EVs through government purchases, thereby stimulating the industry to produce more. Finally, China´s control over battery raw material

processing and mines, and its accumulation of a supply chain will be discussed. This will involve a description of the emergence of a global network of Chinese-owned mines for battery raw materials, especially in Africa, as well as the dominance of China in rare earth metals and the processing of cobalt and lithium. This will lead to the answer as to how state-capitalism led China to become dominant in EV and battery manufacturing.

Literature Review:

China´s political support for its electric car and battery sector is a topic that has been widely discussed in academic literature, especially in numerous studies. Most of the focus of the literature has been on how China has used different measures and policy instruments to further the adoption of electric cars.[1] One academic text by Huston Middleforth argues that the approach China uses in its industrial policy supporting EVs and batteries is a special version of the developmental state model, namely the so-called “Triple Helix Theory”, which means that the state does not just create economic and industrial plans, but becomes “a manager of the frontier technology innovation networks, using the market dynamics as an optimisation tool.”[2] However, apart from this particular paper, there has been surprisingly little literature specifically discussing how China´s policies in support of electric car adoption and manufacturing can be linked to a political-economic economic theory, which would be important as it would fit the sudden rise of China´s EV and battery sector into a global context and explain it as well. It has to be noted that although a lot of literature does describe the impact, implementation, as well as the central planning behind policy tools that could be regarded as originating from a larger political-economical framework, it does not specifically write about how any particular theory as an overarching framework facilitated the advent of the electric car and battery industries and markets in China, and how this framework explains how China had the capabilities in the first place to facilitate the advent of these industries. However, simply analyzing the data and impacts of policies undertaken by China, and describing these policies will not give us the entire picture of the importance of the EV and battery sector to the future of China as a nation, and how it wants to become the world´s primary economic powerhouse.

First of all, the literature argues that the reasons why China has initiated its support for electric vehicles and an associated industry is because the car sector is seen as crucial by the Chinese government in the broader economic development and industrial power of a country, as its is argued when looking at the economic development history of countries such as the US or Germany, or Asian nations such as Japan or South Korea.[3] Moreover, the car

industry also brings with it multiple associated industries, especially with regards to mining and electronics in the case of electric cars specifically.[4] It is argued that China decided to pursue supporting measures for its electric car industry due to the fact that it can “leapfrog” Western and Japanese that just has too much of an advantage with regards to internal combustion engine technology, and the fact that it wants to become independent of foreign oil.[5] According to Paul-Bădescu, China is still widely behind Western and Japanese car makers despite technology transfers and joint ventures with autofirms from these countries, due to the fact that it did not have the capacity and technology to produce the high-tech components of combustion engines and kept being reliant on foreign suppliers for that, which means that Chinese joint ventures only assembled “knocked down kits”, implying they just manufactured parts together that they imported from abroad, so no significant technology transfer took place.[6] To reiterate, literature about this topic essentially argues that the reasons for China to so vigorously pursue the build-up of a domestic electric car industry, among other things because it lags too far behind its competitors in the currently dominant internal combustion engine technology. In addition to that, it is argued by authors that this gives China the opportunity to create an entirely new industry that is not dominated by Western powers. However, even though the literature has touched upon the reasons why China decided to initiate supporting electric cars, it has neglected how this was even possible for China, what traits of its political-economical system allowed it to efficiently pursue these policies, and what the broader context of its political system is that makes it possible for the state to build up this industry from scratch.

A lot of literature has analyzed how China tried to approach government support for electric car penetration and industrial production, and what the impacts of these policies were. It has especially been examined how the focus of Chinese policy incentives is more on so-called “micro-level barriers”, which include high upfront costs, poor technical performance, and insufficient charging infrastructure.[7] However, far less focus is given to “macro-level barriers”, which include, for example, local protectionism or fragmented authority. The problem that could arise with too much local authority might be that nationwide rules are implemented in a way that only benefits the local region (e.g. town of Liuzhou, or Province of Jiangsu) instead of national EV priorities. The problem that arises with fragmented authority is that there are so many agencies in China that have some sort of authority to implement policies for the EV sector that it is very hard to reach a consensus sometimes, and so the rules that are released are very confusing and not uniform.[8] Other literature places the emphasis of China´s policy decisions that support electric car penetration on its tremendous

support for public electric vehicle charging stations, which are much more numerous thanks to public efforts in China on both a total and per-capita basis than in comparable countries such as the US. However, none of that literature makes any connection to a larger political economic framework, policies in support of electric cars are simply assessed and written about in a purely economic analysis framework, it is mostly just analyzed how the Chinese government approaches this issue, but not what the broader context of this pursuit for electric cars are, such as what enabled these policies to be implemented so quickly in the first place, what are the underlying political mechanisms of the country that make these policies so efficient?

There is further discussion of a descriptive analysis of policies from the Chinese government in a variety of academic texts. For example, it is discussed that the Chinese government supports the adoption of electric cars through advantages for these types of vehicles in the awarding of license plates. License plates for big Chinese cities aren´t just handed out, as this would lead to an overcrowding with cars and many negative side effects, such as more pollution and bad traffic. One therefore has to pay huge sums to get the right to a license plate, and sometimes one can only get a license plate through a lottery. However, in places such as Beijing and Shanghai, one can get a guaranteed license plate for free if one chooses to buy an electric vehicle, which led to more EV adoption.[10] Moreover, it is laid out how China set its state controlled auto industry strict targets in terms of the amounts of electric vehicles they are supposed to produce. For example, in 2012, critical governmental targets were established that stated that there should be 500,000 EVs (pure electric and hybrid electric vehicles) on China´s streets by 2015 and 5 million by 2020.[11] Moreover, when China first started to support electric cars, it did so by first implementing pilot zones where policies would be tested. For example, Beijing focused on creating public sector support of EVs, whereas a city like Shenzhen focused on creating a leasing model through strategic partnerships.[12] This approach, as argued in the literature, is reminiscent of past policies of the Chinese Communist Party, which focused on testing new policies in a few selected areas first before implementing them on a larger scale or even nationwide, a strategy first employed by Deng Xiaoping in the 1980s, following the philosophy of “crossing the river by feeling for the stones.”[13] More specifically, according to Middlesworth, the initiation of China´s broader support for electric vehicles was under the Thousands of Vehicles, Tens of Cities Program (TVTC Program).[14] This program entailed a mandatory demonstration project for public transport fleets in multiple Chinese cities to implement electric vehicles to prove their capabilities and functioning, and to provide subsidies for the purchase to local

governments.[15] This further exemplifies the literature´s focus on the systemic tools of China´s approach in furthering the proliferation of electric cars among its populace, but neglects a link to China´s political economical system, by just superficially conducting numerical analysis accompanied by some comments on the effectiveness of policies with no regard for describing underlying systemic political factors.

There is even more literature that focuses on analyzing how effective policies supporting the purchase of electric cars among the Chinese populace were, as it is stated in academic texts that data-driven analysis of the efficiency of policies on support of the electric car sector has come to the conclusion that demand-side policies are more effective in supporting adoption than supply-side policies.[16] Policies that were especially effective in promoting EV sales were infrastructure construction subsidy and charging discount, whereas policies such as purchase subsidies or parking spaces were seen as less effective, which runs a bit contrary to the usual literature about this topic that places great emphasis on purchase subsidies.[17] While most of these literary works talk about the effects and approaches of policies in support of electric car manufacturing and market penetration, there is a noticable gap in the literature in regard to linking these exact policies implemented by China to its political system. This ties into the overall conclusion that in the end, there is no real discussion or even mention of how precisely a political-economical theoretical framework that underlies the fundamental conditions enabling the policies being implemented in China contributes to the growth of the electric vehicle and battery sector, which is what this thesis will ultimately deal with. A theorem that emphasises the role of the state in building up a domestic manufacturing industry will be the framework that will be used to analyze these industrial policies as it best fits China´s approach, especially with its focus on using certain companies as a vehicle to dominate both the electric car and battery supply chains.[18] The sources that will ultimately be used within this thesis will be analyses of China´s political economic model, in combination with literature linking the policies by the Chinese government to its political system, and sources about China´s global involvement in battery raw material supply chains as well as mines around the globe, as there is a noticeable gap in the literature discussing a connection between China´s economic system and its connection to the country´s burgeoning battery industry.

Methodology:

For this research, a variety of data sources will be used. First of all, since the main topic of this research is analyzing the growth of an industry with a political-economic framework, it is crucial to investigate economic literature, as well as works from political economists, especially those explaining state capitalism, but also features of similar economic frameworks. This will especially be used in the theoretical framework section. In addition to that, it will be important to relate the policy decisions of China to state capitalism, meaning that analyses of Chinese policy actions (such as subsidies or regulations), as well as descriptions of those, will be used to illustrate how this framework played a role in China´s electric car industry. First, data about China´s banking sector will be used to illustrate how state-controlled all the financial institutions in the country are, serving as an important tool of its state-capitalist system. Moreover, it will be examined how China uses its centralized governance system to direct local governments to execute tasks mandated by the Politburo across the nation through financial means. This will involve data from companies that have become world leaders in the field of batteries and EVs thanks to China´s policies, such as CATL, Xpeng, and NIO, where their involvement with state-owned banks will be analyzed. Various sources describing favorable regulations and regulation removal for the EV and battery industry will be researched as well. In addition to that, data and reports about ownership structures from the mining sector in the Congo region, but also in Australia and Chile, will be used to illustrate how China has been able to amass a lot of control over the global supply chain of battery raw materials, which gave it an almost unbeatable comparative advantage in this area, as proximity to the refined resources, such as lithium and cobalt, and ownership over them enabled it to massively scale its EV and battery manufacturing capacities.

Theoretical Framework:

The framework that has been selected for this research is “state-capitalism”. There are multiple reasons for why I have chosen to analyze this particular framework. One of them is that comparable alternatives, such as the East Asian Development Model, simply do not fit the case presented with electric cars and batteries as well. This is because the East Asian Development Model places greater emphasis on the achievement of overall economic growth, as was the case with the “Four Asian Tigers” (Taiwan, South Korea, Singapore, Hong Kong) starting from the late 70s.[19] According to the UN, the “Developmental State Model“ is defined as ”a state where the government is intimately involved in the macro and micro-economic planning in order to grow the economy”.[20] While there is certainly a long-term plan by the Chinese government to pursue large-scale economic growth through

the manufacturing of electric vehicles and batteries, the reason China is pursuing support of its electric car industry is not to achieve quick-paced economic growth, but rather as a long-term investment into a technology of the future that will allow it to become less dependent on foreign resources such as oil, as well as batteries that will enhance its energy production and security.[21] While industrial policies are a key element of the East Asian development model, these industrial policies were oftentimes directed towards, as explained before, quickly building up an export-oriented industry that can quickly generate revenue from these exports for the government.[22] Chinese investment in its EV sector, however, is more focused on creating a domestic market and thereby literally changing the use of its primary energy sources such as oil and electricity generated from coal, which will be replaced by battery stored renewable energy to a large part.[23] Direct exports are more of a goal for the far future and not an immediate priority. Other features of the East Asian model are that they focused heavily on maintaining a high savings rate among their population, and they invested heavily in education and made enormous investments in human capital.[24] While an educated workforce, as well as the availability of a high savings pool to tap for the government to invest were certainly important for the fundamental basics that enabled the Chinese government to support the electric car industry the way they have, they were not the essential factors that describe the policies in support of electric cars and batteries in China. Moreover, it is hard to define one single “East Asian development model”, as each “tiger country” had some different approaches, making it hard to employ it as a strictly defined overarching framework for the industrial policy that China uses to support its electric car and battery sector. As an example, while Singapore and especially Hong Kong focused far more on the financial sector in their development, Taiwan and South Korea placed their emphasis on the export of industrially manufactured goods and heavy and electronic industry in general.[25]

Moreover, the East Asian development model in the case of Japan and Korea was not as much geared towards attracting foreign direct investment, but rather on export-led industrialization by the “keiretsu” and “chaebols”, whereas China´s electric car sector definitely has some FDI involvement.[26] This is exemplified by Tesla´s investment in China and foreign capital having stakes in Chinese EV start-ups like NIO and XPeng.[27] The developmental state model also shows a lot of similarities with “state-capitalism”, but it is also not suitable for the analysis of China´s electric car industry, as, unlike state capitalism, this theory states that recognizes “economic development as the primary goal”, or in other words, a “growth first policy”.[28] While China definitely wants to dominate the global market

for EVs and batteries in the future, it does not promote them on a “growth first” basis, as other sectors of the Chinese economy are driving its growth, such as construction, the property sector, steel manufacturing, and exports of electronic goods.[29] While China´s pursuit of an own electric car and battery industry does employ classic features of the development state model, such as absorbing technologies and quickly realizing economies of scale, the main features of the development model are something different.[30] The developmental state model, overall, while certainly having significant overlap with the economic definitions of the state-capitalist model, does make socio-economic claims, such as stating that the main goal of this model is to balance economic growth with social and human development, or that the development state model´s main aim is to tackle poverty, which are claims that are not as relevant for the discussion of a purely economic and geopolitical analysis of the reasons and means that China employs to build up the aforementioned industries.[31]

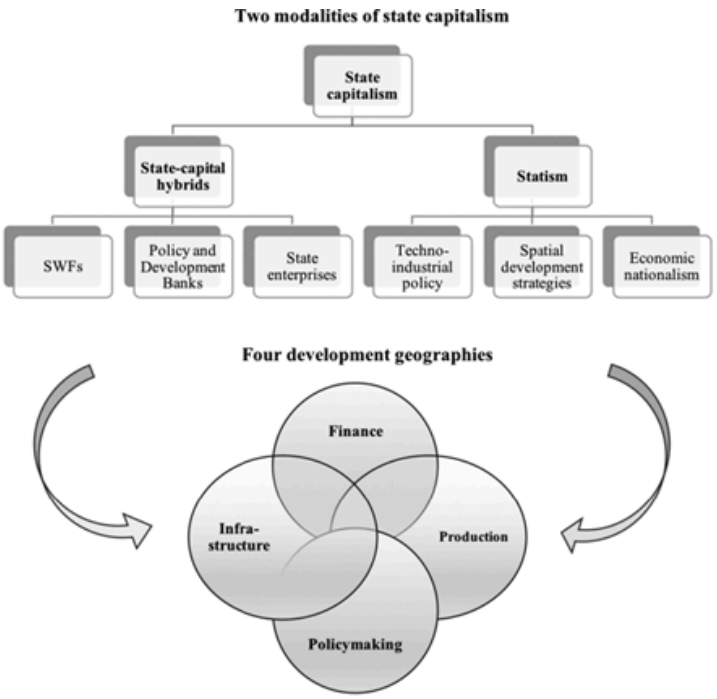

Figure 1: Source: Alami, Ilias, Adam D. Dixon, and Emma Mawdsley. *Antipode 53*, no. 5 (2021): 1312.[32]

Based on the analysis of previous economic theorems that could serve as a framework for analyzing the policies supporting EVs and batteries, there are several reasons why state capitalism will be used to explain China´s industrial policy. First of all, by definition, state-capitalism is an “economic system in which private capitalism is modified by a varying

degree of government ownership and control".[33] This definition is purely focused on the economic aspect of industrial policies and does not imply the pursuit of social or development goals, which certainly might also be present, but are not important for this analysis. Secondly, as Figure 1 shows, **"**state enterprises", "techno-industrial policy", and "policy banks", which are essential components of state capitalism, are highly relevant for this analysis of China´s EV and battery support policy.[34] In addition to that, it makes no mention of quickly realizing GDP growth, which certainly can be an important impact of China´s electric car industry in the future, but is of less relevance right now, where the reasons for investing in this industry are manifold and different, as will be analyzed later. State-capitalism is also defined as "an economic system in which the state uses various tools for proactive intervention in economic production and the functioning of markets."[35] "Various tools" in this case will mean measures such as subsidies, quotas, protectionist policies, mandated purchases and more for electric cars and batteries, and is therefore highly applicable for the topic under discussion.

China´s political-economic system is described in the following way: "Since the early 1990s, Western observers have come to a loose agreement that "state capitalism" both sufficiently captures the entrepreneurial dynamism that can readily be found throughout the country and acknowledges the guiding role of the state or, more accurately, the Communist Party of China (CCP)."[36] In the specific case of support for EVs and batteries, the support through the financial sector through subsidies and easier access to loans is a highly crucial element of state capitalist theory.[37] It is argued that subsidies, which include free to low-cost loans or inputs in terms of access to land and technology, are a key element of China´s state capitalism, and they also play an enormously important role in the pursuit of building up an EV and battery industry, as this research will aim to demonstrate later.[38] Really important to consider here when talking about the finance aspect of state capitalism is that "85 to 90 percent of financial assets in China are controlled by state-owned institutions".[39] This is highly important to illustrate how the Chinese state is able to implement its measures to promote the nascent EV and battery industry. Chinese state capitalism, however, does not only express itself in the country´s financial capabilities, but also in how private companies apparently behave like state-owned enterprises due to their extremely close ties to the government.[40] In China, state capitalist tools do not only originate from the central government, but also from local governments, which are an integral part of China´s state capitalist system, as local governments, in this case, function as sort of "vehicles" to execute

the economic directives from the central government, thereby serving as a mechanism for the Chinese ”one-party state” version of state capitalism.[41] These exert their control over the economy by taking stakes in Chinese EV companies.[42] Finally, state capitalism is also involved in the use of China´s state-owned enterprises, and the way in which they have accumulated tremendous control over the global supply chain of battery raw materials through mining and refining. The various forms in which state capitalist theory explains China´s nurturing of a world-leading manufacturing industry will be described in more detail in the following sections.

Data Analysis:

Financial support through state-owned banks or investors for enterprises in the EV and battery sector:

In order to fully understand how precisely the growth of China´s EV and battery sector is best explained through a state-capitalist framework is by looking at how the financial power of a state is used in this context. China has tremendous control over the country´s banks, controlling about 83% of all financial assets in the country and providing about 85% of all loans. As an example of just how powerful the financial sway of the Chinese state is, the four largest banks in the entire world are all Chinese state owned banks.[43] These state-owned banks have tremendous financial means at their disposal, approximately $16 trillion.[44] In specific contrast with the loan system of the United States, Chinese banks are the main givers of loans, whereas in the US this happens under a much more liberal economic system with financial markets.[45] Moreover, the Chinese government not only owns all the important banks, but it is also significantly involved in the decision making process in these banks and the banks themselves basically serve as a means to an end to execute directions from the central government.[46] The careers of the highest bankers are decided not by accomplishment in the free market, as is the case in the West, but by the decisions of the government.

The reason why this is relevant is that financial tools were a significant state-capitalist tool used by China to promote the emergence of an electric car manufacturing industry, showing how precisely state-capitalism was used to promote China´s aims in this sector. As described before, state-owned financial institutions are responsible for the significant majority of loans issued in China, and loans are something young, cash-strapped start-ups

trying to enter the costly and low-margin manufacturing industry desperately need. Examples for this abound. Very prominently so the case of NIO, a burgeoning electric car start-up that received over $1.5 billion in funding from Anhui Province and its capital city of Hefei in early 2020 when the company began to be in trouble due to the COVID epidemic and threats from rival companies such as Tesla, and was even on the verge of bankruptcy. But not just the local government of Hefei invested in the start-up, state-owned car makers such as JAC Motors were also used as a vehicle for state investment by participating in the funding round that saved NIO. In this particular case, NIO did not receive any funds from capital markets and foreign investors anymore, as they saw the business case of the company as too risky, especially, as mentioned before, due to the circumstances of the pandemic and powerful competition, which was why the government had to intervene.[47] The company was also making significant losses, especially in the years before 2020, losing collectively over $4 billion dollars.[48] Moreover, the Chinese government´s financial support did not come without conditions, in the sense that NIO had to relocate a significant part of its operations to Hefei and make changes to its management and ownership structure that gave the state-owned entities a bit more say in how the company is supposed to be run.[49] Another instance in which the Chinese state used loans to support NIO was recently when the company decided to expand through a venture called “NeoPark”, which will be a gigantic cluster of car and battery production sites and R&D buildings.[50] In this project, the government of Hefei will also be involved significantly with loans, operating under the directions given in the 14th five-year plan of the central government which calls for more support for “new energy industries”.[51] But the government not only used loans as financial instruments to help NIO finance the facility, it even issued special government bonds to obtain more funds, which were subsequently also used for the project.[52] Lastly, the government even took over the construction of the facility using the funds obtained through the special bond issuing, providing NIO with another vital form of financial support and relieving the burden from the company´s financials.[53] And to get back to the issuing of loans to NIO that saved the company from bankruptcy from the Hefei government, these loans not only led to financial involvement, but also to ownership of parts of the company from the government. According to Bloomberg, the government later even capitalized on its partial ownership of NIO by selling some of its ownership with a great return on investment.[54]

It was not just NIO that received significant financial help from the Chinese government, but also Xpeng, another large Chinese electric car start-up. In January 2021, it signed an

agreement with some of the largest banks in China, including the Agricultural Bank of China, the Bank of China, and the China Construction Bank, which are all state-owned entities, for a line of credit of over RMB12.8 billion, or about $2 billion.[55] This strategic cooperation between major state-owned financial institutions and a burgeoning home-grown EV start-up further demonstrates how state money is used to prop up the domestic electric car industry, as Xpeng will use this money for the “expansion of its manufacturing, sales and service capabilities”.[56] Xpeng also got investments from entities owned by local governments, such as the one in Guangzhou, where Xpeng´s factory is located. The start-up reached a strategic agreement with Guangdong Yuecai Investment Holdings Co., Ltd. (“Yuecai”), the investment arm of the Guangdong provincial government, for an investment of about RMB500 million, or $80 million, too be used specifically for the expansion of production facilities in the area.[57] The city government of Guangzhou has even supported Xpeng directly with a $600 million loan back in 2020 so the company would build a new factory in the city.[58] While Xpeng might not be government-owned and is in fact a publicly listed company, the fact that it receives a significant part of its funds from state-owned entities signifies a major part of the strategy China employs to support the industry, which is acting almost as some form of a venture capitalist entity that support young start-ups in this sector with conditions attached, but in line with its overall policy directions. It is not as straightforward as compared to other state-capitalist measures such as direct state ownership, as exemplified by companies such as China State Grid,[59] but it is state-capitalism nonetheless, as government money is used to prop up local players in the manufacturing industry.

More examples of loans from state-owned entities to Chinese EV companies are the case of Byton, another EV startup. There, the Nanjing Municipal Government’s industrial investment fund is a significant investor in the company that manufactures its cars in the city as well.[60] Moreover, the state indirectly both invested and acquired a stake in the start-up by using the state-owned car manufacturer FAW Group as an investment vehicle leading a founding round that raised over $500 million in 2018.[61] In the case of BYD, a rather established electric car manufacturer, there was indirect support from the government in the form of heavy subsidies for its vehicles.[62] Moreover, Shenzhen started to support BYD even back in 2011 by guaranteeing large purchase and lease agreements for the company, which provided it with a market to kickstart its growth story at a time when there was not really a customer base for electric busses and vehicles.[63] In addition to that, the government of the city of Shenzhen also provides BYD with significant tax deductions that allow it to gain a

business advantage.[64] Another electric car company that received a lot of financial help from state banks is Tesla, which is an odd case since it is a foreign manufacturer but was nevertheless deemed critically important by relevant authorities due to its expertise in electric car technology. In 2019, Tesla received over $1.6 billion in loans at preferential rates from a consortium of state-owned Chinese banks, among them China Construction Bank Corp, Agricultural Bank of China, Shanghai Pudong Development Bank, and Industrial and Commercial Bank of China, to be used for the construction of the local factory.[65] The loan could also be used to service debt, and to hire local workers.

Another intriguing example of how the Chinese government supported the native industry through loans and financial measures is the case of the battery maker CATL. Back in 2011, when the EV sector was only just about to emerge in China, CATL needed a customer in order to kickstart its business, which is where the state-owned auto manufacturer Brilliance Motors stepped in in cooperation with BMW, signing the first purchase contract for battery cells with the young company.[66] Through this, they indirectly provided an income stream for CATL, which could then safely start production knowing that they had secured purchases for their battery cells. In addition to that, according to information from the New York Times, an investment firm which is mostly owned by the Bank of China called BHR Group was one of the investors in CATL in 2016, providing another example of how state-owned financial actors provide funds to upcoming players in the EV and battery manufacturing industry.[67]

Regulatory benefits for EV and battery companies from the Chinese state:

The Chinese state does not only have financial tools to leverage when trying to aid young manufacturing companies to grow and gain a foothold in a market. Any manufacturing business, especially ones producing bulky goods such as cars, needs a lot of space. The Chinese government is able to aid companies with this, as it owns a lot of public land, especially in the outer skirts of major cities. Industrial companies in general receive preferential treatment in China with land for these purposes on average much cheaper than residential land.[68] In fact, the strategy of attracting industrial development to China through the provision of cheap land has been employed at scale before already, specifically during the build-up of the consumer electronics sector with companies such as Foxconn.[69] This tool was employed multiple times to aid electric car and battery companies in the development of their facilities.[70]

The first such instance was when Tesla decided to construct a factory in Shanghai, and required a location close to a major city and a harbour for import and export of raw materials and cars. The way this particular example fits into the larger framework of Chinese state capitalism, despite it being a foreign investment, is that the state provided the necessary subsidies and favorable investment conditions for the factory, otherwise it is unlikely it would have been constructed there. And as described previously, this factory was financed with loans from Chinese state-owned banks. The state-capitalist financial tools employed to offer the plot of land in Shanghai to Tesla were significant discounts on local industrial property prices. According to the Ministery of Natural Resources in China, industrial land in Shanghai and its surrounding area usually costs RMB 2620 per square meter at the time Tesla bought the land in October 2018.[71] Tesla however paid RMB 973 million for about 850000 square meters, meaning they only paid about RMB 1124.8 per square meter.[72] But the low price was not the only thing that was noteworthy about the land deal with Tesla. Before this agreement, no foreign manufacturing enterprise could purchase land from the state and own and operate it alone.[73] This was a paradigm shift, and just further indicated how important the electric car sector and its development is to China, that it was willing to undergo such a dramatic change in ownership structures and how state resources are allocated to support a manufacturing enterprise. Another young start-up active in the electric car sector called Li Auto has also been granted access to cheaper land for its industrial developments in the city of Chongqing. There, it has purchased 1.13 million square metres of land for about RMB430 million, or about RMB380 per square meter, according to information from the Chongqing Public Resources Trading Center.[74] This is below the average of almost RMB500 that industrial developments usually have to pay in Chongqing.[75]
In the case of NIO, the government did not even need to offer its land cheaply to the company, it simply rented out already developed land owned by the state-owned car manufacturer Jianghuai Automobile Group in Hefei, where it would undergo a manufacturing partnership with this company.[76]

However, it is not just electric car companies that have received a significant amount of cheap land, but also companies like CATL, the nation´s largest manufacturer of battery cells. CATL received cheap land for the building of its factory in Ningde, Fujian.[77] But most importantly, the measures with which CATL is provided with cheap land is through the integration of its facilities in designated so-called “high tech parks”, such as the “Tong’an-Xiang’an High-tech Industrial Base”, where the plots are especially reserved with attractive price conditions for manufacturing facilities or research institutes that are supposed

to bring industrial development to the area.[78] This project was initiated by the CCP Xiamen Municipal Committee and Xiamen Municipal Government.[79] The price conditions in this area are only RMB400 per square meter.[80] This is significantly less than the average land price for industrial developments in Xiamen, which is at approximately RMB643.[81]CATL decided to build a factory in this location.[82] Another example for this is CATL´s factory in Liyiang, Jiangsu, where it was set up in a designated area called Jiangsu Zhongguancun Science and Technology Industrial Park, which was also established by the local government of Changzhou.[83] It has similar attractive conditions in terms of property prices and location.[84]

However, the Chinese state cannot only offer material goods such as money or cheap land to enterprises in the EV and battery sector. It can also make these company´s lifes easier by easing regulatory burdens or speeding up processes related to the regulation of products. This can be a very powerful tool for the state, as tweaking rules and regulations for products can lead to a company gaining a comparative advantage quickly by also improving its product through trial and error, which is important for a company as they need flexibility in their product cycle development.
One very noticeable instance in which China pursues more lax regulations in order to aid the growth of its electric car market is the example of the Wuling Hongguang Mini EV. This particular vehicle is manufactured by SAIC, a state-owned major car manufacturer.[85] It is the most sold electric car in China in 2021.[86] However, what is peculiar about this car is that it has to comply with far laxer safety regulations in China compared to such imposed on cars in Europe, the US, or Japan. As an example, it is not required to have an airbag, which saves a lot of manufacturing costs as it makes the products less complex.[87] In addition to that, it is not required to have any advanced driver assistance software.[88] And finally, it is severely lacking in the quality of its steering wheel adjustment, as well as its body stabilization systems, creating a lot of safety issues, which would make it difficult to achieve legality in advanced car markets outside of China.[89] In addition to that, the vehicle weighs only 700kg and has a top speed of 100 km/h, which would be smaller that the smallest cars on offer in most car markets.[90] In general, Chinese safety regulations are laxer overall for cars compared to other places, which already provides manufacturing companies with an advantage in the sense that they can move much quicker towards production as there will be fewer safety procedures and controls.[91] However, flexibility in safety regulations is not just relevant when analyzing the car industry. An instance in which China has helped its

domestic battery industry gain an advantage in the speed of product development was when it decided to drop the so-called “nail test” for CATL once it became apparent that there were negative test results, as the batteries started to catch fire.[92] This test basically involves a nail being driven into the battery to test the rigidity and safety, as well as the quality of the product.[93] Finally, a broader regulatory advantage is given for Chinese manufacturers in general in the form of more lax environmental regulations compared to other countries, which is highly beneficial for energy-intensive manufacturing activities involving goods such as cars, as it allows factories to be erected faster and more cheaply, as less safety and anti-pollution measures have to be implemented.[94] In fact, lax environmental regulations have long been a comparative advantage for China, attracting a lot of foreign direct investment for its manufacturing sector.[95]

Relaxing regulations is also an important state-capitalist tool as it gives manufacturing companies specifically an advantage to ramp up their production line quicker and omit certain parts, making the process as a whole cheaper and the product more competitive pricewise. Sometimes, their implementation is crucial when wanting to help a domestic manufacturing enterprise achieving an increase in sales, especially during its start-up phase. This was very prominently the case with CATL in its infancy back in 2011. It became especially pronounced in 2015, when China began to indirectly mandate that manufacturers of electric cars that want to sell on the Chinese markets had to use Chinese-made batteries.[96] This was implemented not by creating a direct ban for foreign battery manufacturers, but by regulating that if an electric car manufacturer wants to qualify for subsidies in the Chinese market, he had to use batteries from a Chinese producer.[97] This created a tremendous market opportunity for CATL, as it suddenly had no real competition anymore and was practically overwhelmed with new customers. Initial subsidies for Chinese electric vehicles were only given to a particular battery chemistry as well, namely the lithium iron phosphate, or LFP chemistry, which was only produced by domestic manufacturers.[98] Foreign manufacturers preferred “ternary” batteries, which are lithium-ion batteries made with a nickel and cobalt-based cathode.[99] However, China did not just exclude foreign battery makers from its market for a long time, in its early stages from 2011 onward, it also banned the import of foreign electric cars altogether.[100] It was stated that in order to be eligible for subsidies from the Chinese state, an electric car had to have a domestic company “display mastery” over the motor, the inverter, and the battery of the car.[101] Moreover, there are other, less direct regulatory advantages that are provided by the state.

Regulations do not only have to involve bans or preferential treatment, but they can also be used in providing easier access to essential goods for manufacturing endeavors. One such instance was during CATL´s factory construction in Fuding in Fujian, where, according to local government officials, there were a lot of temporary regulations cuts, especially with regards to the installation of water and power supply, as well as regulations for flood control.[102]

All these measures, whether it is access to cheap land, or flexible and lax regulation, or outright technology bans and mandates, illustrate how legal measures backed by state power can be used to promote the growth of domestic industries, with the state essentially using and tweaking the national laws as it pleases to nurture and protect home-grown players. It illustrates perfectly how the law is used within a state capitalist framework.[103]

Policies that facilitated the construction of EV infrastructure before there was a demand for it:

A government cannot only aid in the development of a domestic industry through financial or material means, but also through solving a major problem that hinders the adoption of most new technologies. And that is solving the so-called “chicken and egg problem”, which relates to the electric car industry in the following way. Electric cars need a charging network as a necessary infrastructure requirement to further the adoption of the technology. It would make no sense to introduce electric cars without places where drivers can charge them. However, no one will invest in a charging network if there are no electric cars and vice versa. So who will make that crucial first step to introduce a charging infrastructure before it makes economic sense? This is where the state comes in, twisting the market to suit its goals by taking the financial burden upon itself to create a charging network to help in the proliferation of electric cars. Subsidies are oftentimes necessary for a nascent technology, as there is no sensible business case to be made so far in clustering China with charging piles, as there is simply not sufficient demand yet.[104]

The fruits of China´s initiative can be seen by looking at the numbers. China possesses over 60% of all public EV charging stations in the world.[105] The plans of the Chinese government are outlined in policy initiatives such as the “Guidelines for the Development of Electric Vehicle Charging Infrastructure (2015-2020)”, where it is stated how over 4.8 million charging piles are supposed to be built around the country.[106] According to announcements

by the government itself, it is planned to further pursue the construction of more charging stations around the country until 2025 with the specific aim of ensuring further EV adoption.[107] There are various ways in which China implements subsidies for electric car chargers, and significant regional differences. One example is Shanghai, which provides about 30% of the initial investment for equipment installation and acquisition, and about RMB 0.2 per kw/h once in operation.[108] Cities like Wenzhou subsidize about 30% of the entire investment in the charging pile. Guang'an subsidizes about 300 RMB/piece for each charging piles put into use. Other cities make a specific distinction in their subsidy policy between alternating current (AC) or direct current (DC) chargers. Shenzhen subsidizes about 600 RMB/kW for DCs and 300 for ACs, whereas Nanjing subsidizes about 900 RMB/kW for DCs and 600 for ACs and Wuhan subsidizes 600 RMB/kW for DCs and 400 for ACs.[109] This demonstrates how although there are regional variations in the support for charging infrastructure, there is an overarching goal of the government to incentivize the construction of a charging network. However, China does not only support the construction of the extensive charging network, it also actively supports research and development in this sector to improve the quality of the charging stations, as private business so far has no incentive to invest in this technology to this extent.[110] However, the EV sector was not just supported through indirect measures such as infrastructure construction, but also through direct purchase mandates for the product itself. Before there was any market for electric cars, the nascent EV industry needed buyers. But since there was hardly any private individual willing to make the purchase of a very unproven technology, the government had to step in. Until 2010, it was the only entity purchasing electric cars, due to directions and mandates from the central government.[111] It was only after 2010 that the government started to incentivize private consumers to purchase EVs as well, especially with programs such as the “Ten Cities Thousand Cars” initiative.[112] This solved another “chicken and egg problem” in the sense that it created artificial demand for electric vehicles for producers which was necessary to get the industry started in the first place.

Analysis of China´s control over raw material processing and mines, and its accumulation of a supply chain:

One of the most important factors of China´s long-term planning to dominate the electric car and battery industries of the future is its control over the supply chain of the crucial resources that are needed for these products. Over the last decade and even earlier, China has started to concentrate almost the entire processing and refining chain for critical raw

materials such as lithium, cobalt, and rare earths in its country, and has constructed a global network of mines under direct ownership of state-owned enterprises, especially for cobalt in the Congo.

First of all, it is important to consider that cobalt is a crucial element in the so-called nickel manganese cobalt (NMC) battery chemistry, a subtype of lithium-ion batteries.[113] The largest producer of cobalt by far in the world is the Democratic Republic of Congo, having produced an estimated 120.000 metric tons in 2021.[114] This was particularly noteworthy because the world production of cobalt that year was about 170.000 tons, meaning that the Congo produced a bit over 70% of all cobalt in the world.[115] What strikes one as noteworthy, first of all, is that the Congo exports cobalt worth about $2.36 billion per year, but of that, $2.17 billion is bought by China alone, meaning that 91.9% of the nation´s cobalt is exported to China.[116] There are multiple reasons for this. First of all, China has now for years been successfully tightening its grip on the Congolese cobalt sector. China has gained access to the cobalt resources by signing deals with Congolese officials to invest in the infrastructure of the Congo, such as back in in 2008 when the state-owned Export-Import Bank of China pledged nearly US$9 billion in loans to build and upgrade the DRC's road (4000 km) and rail system (3200 km) for transportation routes to its mines.[117] These loans were securitized by China gaining access to over $14 billion worth of copper and cobalt resources in the country, and over 68% ownership of the mining joint venture "Sicomines" formed with the Congo for its state-owned companies.[118] The deal gave the Chinese companies guaranteed access to about 600.000 tons of cobalt at that time.[119] And China continues to further accumulate control over the cobalt mining sector there to this day. In 2020, China Molybdenum, a state-owned company, purchased rights for the highly promising Kisanfu copper-cobalt deposit for about $550 million.[120] The company had already purchased another large cobalt mine back in 2016 for about $2.65 billion.[121] Other companies, such as state-owned "China Nonferrous Metal Mining Group (CNMC)", have also acquired significant assets in the Congo, such as the Deziwa copper and cobalt mine in 2015 for $800 million.[122] China now fully controls or has a financial stake in about 15 of the country´s 17 cobalt mining operations.[123] But China does not only control the cobalt mines, it also controls what happens once the cobalt is shipped out of the country. According to the International Energy Agency, over 65% of the world´s cobalt is refined in China.[124] China has the capacity to refine almost 150.000 tonnes of cobalt, which is a significant chunk of the world´s

production.[125] This concentration of this critical raw material is part of a long-term strategy by China to give its electric car and battery industry access to cheap and abundant raw materials so they may gain a comparative advantage in that sector.

However, cobalt is not the only raw material crucial for batteries that China has acquired disproportional control over. Lithium is another element that every battery needs, as it is a lot more energy-dense compared to materials previously used in batteries, such as zinc or lead.[126] There, China has also amassed great control over the refining market, being responsible for about 60% of the global refining output of lithium.[127] In addition to that, the largest hard-rock lithium mine in the world near Greenbushes, Australia, is owned to 51% by Tianqi Lithium, a Chinese company.[128] Ganfeng Lithium, another Chinese company, is the largest importer of spodumene concentrate, which is a precursor material to produce lithium salts, in the world.[129] In fact, China imports almost all lithium spodumene in the world, especially from Australia.[130] China is the world's largest producer of processed lithium chemicals and refined lithium compounds.[131] Companies like Zijin Mining, partially state-owned, are acquiring lithium miners and resources all around the world.[132] Zijin is also involved in the exploration of lithium in the Congo.[133] Even one of the few non-Chinese companies leading in the lithium sector, Chilean SQM, is owned to a significant part by Tianqi Lithium.[134] Tianqi used a loan of $4 billion from state-owned CITIC Bank to carry out the acquisition.[135]

Finally, China is also involved to a large degree in the global rare earths market with its state-owned enterprises. Rare earths, such as neodymium, are highly important for the motors that drive electric cars, as they are permanent magnets and therefore enhance the performance of the vehicle.[136] In this sector, China has acquired a staggering dominance, with almost 90% of all rare earth metals refined in the country.[137] China also mines about 63.6% of all rare earths in the entire world, so it has the entire supply chain of these critical materials present within its territory.[138] In this case, the reason why China dominates in this sector is not through state-led investment projects in foreign countries or the acquisition of mines or other companies, but due to the lax environmental regulations that made China the most cost-effective player in the rare earth market, despite the fact that it does not have a natural geological advantage, as rare earth metals are present in other countries as well.[139] The industry is heavily state-controlled, with dominant companies like China Minmetals Rare

Earth, Chinalco Rare Earth & Metals, and China Southern Rare Earth Group being state-owned. In fact, for a long time, China´s rare earth industry was not remotely profitable, as the state-owned players could drive out competitors, especially American producers, from the market by using state backing to undercut their prices.[140] China even consolidated its dominance in this sector further by merging some of its largest companies into one state-owned player that would control over 70% of the global rare earths market in December 2021.[141]

Discussion and Conclusion:

It becomes apparent how China´s state-capitalist approach impacts upon its leading role in the world's electric car manufacturing space through a variety of examples.
First of all, using its sway over the tremendous financial resources state-owned banks possess, it actively targets electric car start-ups such as NIO, and provides them with cheap loans, which it sometimes obtains through measures such as issuing special government bonds to aid the companies financially. According to announcements by the companies themselves, they engage in deep cooperation, often of a financial nature, with regional governments that provide them with access to cheap capital, and sometimes even take a stake in them. In fact, what may be observed in China´s policies supporting EV companies is a new type of state capitalism that could be described as "venture state capitalism", as local governments fund start-ups that have a lot of growth potential, and sell some of their stakes with return on investment later, as was the case with Hefei and NIO.[142]

But the state did not just support companies directly with loans, it provided "indirect" flows of capital by guaranteeing purchases, such as in the case of BYD and Shenzhen, as well as with CATL and Brilliance Motors. This created artificial demand for these companies allowing them to grow and achieve economics of scale, whereas under normal market conditions they likely would not have survived.[143] Another state-capitalist tool that China employs that benefits especially manufacturing companies that need a lot of space is the provision of cheap land for expansion and construction. Cheap land is also an indirect way of providing companies with funds as they gain a competitive advantage compared to other companies without preferential treatments, clearly indicating the preference of a state for one type of industry. However, eliminating bureaucracy that could hinder the growth and success of the companies is also an element of state-capitalism that can be observed in the case of EV and battery ventures and China, as safety regulations are relaxed to give their company an

advantage in terms of the speed with which their product can come into production, either by not requiring certain elements in cars or by abolishing certain safety measures during the construction of factories, as was the case with CATL in Fujian. Lax oversight has been used by China before in different industries to give its company an edge over competition in countries with much stricter laws.[144]

Another way in which state capitalism is used in China is not just by creating artificial demand for products, but also by providing the infrastructure necessary for a product to proliferate in society, which is the construction of a charging network in the case of electric cars. State intervention and subsidies solve the problem of no one investing in a charging network if there is no short-term profit to be made due to a lack of electric cars, and no one making electric cars, as no one will buy them if they can´t be charged. It would be too risky for any private market player to enter the market for EV chargers with no customer base present, so that led the government to take the crucial first step.

Finally, the government of China played an essential role in amassing a supply chain and ready access for its EV manufacturers to critical raw materials. It did this through a variety of ways, the first one being by using the state´s financial power to give credits to developing countries, and in return receive the rights to mineral extraction, in this case cobalt. Subsequently, Chinese mining companies, many of them state-owned, can extract the raw materials and sent them to China, where they are needed for battery manufacturing. Controlling the world´s largest cobalt producing region, gives China an advantage as the supply chain becomes concentrated in the country, also due to its dominance in the refining of the product. Similarly, with lithium, though the extraction of it is not dominated by one single country as in the case with cobalt and the Congo, Chinese companies (both private and state-owned) own a lot of mines abroad, especially in Australia, allowing it to considerably influence its supply chain. Even Chinese private companies finance their highly strategic acquisitions of foreign lithium companies with loaned state money. By having access to almost all the world´s cobalt and lithium right in front of their doorstep, battery companies in China find themselves in a more advantageous position than any foreign battery company that has to spend much more on obtaining these raw materials, through higher transport cost, less vertical integration, uncertainty of supply etc. And no sector is more dominated by the state directly than rare earths extraction, crucial components for every EV battery, that is almost exclusively produced by state-owned companies in China, providing one of the best examples of Chinese state-capitalism in existence.

In conclusion, various aspects of the state-capitalist economic framework, such as state-owned enterprises and banks financing both start-ups and the acquisition of foreign raw materials, as well as general industrial policies such as subsidies for infrastructure and public procurement of vehicles to artificially create demand for EVs, helped China to achieve a world-leading role in both EV and battery manufacturing.

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