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The Competing Hegemony of Developing Sustainable Private Vehicles: An Ethnographic Analysis of Friction Between China's Conventional and Electric Vehicles' Cultural Values

By

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Abstract

This ethnographic study examines the causes and consequences of frictions produced during the value-making process of Chinese electric and conventional vehicle supporters. Previous scholars such as Gökçe Günel (2019) revealed that the tensions created by heterogeneous views shape the ideologies of smart urban spaces. Here I elaborated on Günel (2019)'s argument by borrowing Anna Tsing (2011)'s concept of "friction" throughout the analysis to strengthen how tensions created by the heterogeneous views produce competing hegemony that makes creativities invisible. I identified five technical and sentimental values related to China's private automobiles. The five values in this study are *Intelligence (technical), Mechanical Structure (technical), Nostalgia (sentimental), Progressive Nationalism (sentimental),* and *Environmentalism (technical & sentimental)*. I examined how social cohesions are formed to develop competing hegemony based on the ways that electric and conventional vehicle supporters categorize the properties of these values. Finally, I argue that in order to achieve the production of sustainable private automobiles in China, the automobile industries and interest parties need to seek collaboration through acknowledging the friction and negotiating the conflicts.

Keywords: Competing Hegemony, EVs, Friction, ICEVs, Sustainability, Social Cohesion, Smart City.

Introduction

The tension between electric vehicles (EVs) and internal combustion engine vehicles (ICEVs) is intensifying because more and more policymakers and activists are striving for a more environmentally friendly future. In 2008, the US established the Energy Improvement and Extension Act (congress.gov, 2008) which promotes electricity production through renewable energy. Besides regulating electricity production, many states, including California and Washington in the US and many countries, such as Japan, the UK, and China, drafted policies to ban or limit the future production and sale of new ICEVs [1]. These strategies have led to censures from the traditional car industry. For example, the chef of Toyota, Akio Toyoda, criticized that the hasty ban on ICEVs would collapse the current business model of the car industry (Landers 2020). The industry is not the only side to condemn these policies. Proponents of traditional vehicles also expressed their disagreement with the bans on ICEVs. Stefan Gossling (2017) illustrated that some drivers protest the newly established environment protection policies through rolling coal. The actions of coal rolling release black smoke containing high amounts of greenhouse gas. These protests unmask frustrations between EV and ICEV owners/proponents during this transitional period.

My research study is developed with an interest in understanding more about these frustrations. When I started this project, my primary purpose was to understand why the polarization between EV and ICEV supporters exists. I interviewed Chinese individuals in the car industry to develop a better understanding of this problem. I chose China because it is a

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[1] California proposed to increase 35% sales of zero-emission cars, including electric cars by 2026 (California Air Resources Board 2022). Washington established law to prohibit future sales of cars other than EVs by 2030 (lawfilesext.leg.wa.gov). Japan also planned to ban the sales of new gasoline cars by mid 2030s (Landers & Tsuneoka 2020). UK established "green industrial revolution" to stop the sales of petrol and diesel cars by 2030 (Harrabin 2020). The MIT news shows that China plans to reach 40% sales of electric cars by 2030 (Stauffer 2021).

country that is going through aggressive development of EVs and has a comparably (to other industrialized countries) young automobile industry. Therefore, the transition from ICEVs to EVs is much more unstable and complex, providing profound insights into this tension.

The history of automobile development in China is a history of struggling for national transportation modernization. When talking about the poor quality of Chinese ICEVs, elders always add that it is almost impossible to catch up with western manufacturers because the start of the Chinese automotive industry was already about 100 years late. Nevertheless, the poor quality of Chinese conventional cars does not impede the development of Chinese car culture. Many young people in the early 21st century grew up watching international sports car events, learning the sociocultural values of cars, and generating their perspectives on cars. As a commodity inherited from the western world, cars are shaped with values that are inarguably tied to community belongings and nostalgia (Green-Simms 2017).

Many studies examine the relationship between private cars, individual-community identities, and social bond transformation. These previous studies, such as popular culture studies in automobile cultures or consumer studies of cars, have either focused on one car culture or another. Many of these scholars concentrated on analyzing automobiles in the community belongings/solidarities, symbolic representations of cultural identity (Brownlie et al. 2007), masculinity identities (MellstrÖm 2004), and consumption preferences (Lin & Wei 2017; Sovacool et al., 2019; Tchetchik et al., 2020).

Yet, the situation between cars and humans becomes more complex with the popularization of private EVs. Policies and regulations that ban or limit the production of ICEVs, along with those welfares and bonuses that promote the production of EVs, lead to the toughness of manufacturing ICEVs while potentially stimulating the prosperous conditions for promoting

EVs. And this prosperity creates tensions between conventional and new-energy vehicles, mainly EVs. In China, a car is called: "汽车" (Chi Che), which means "gas/vapor vehicle." The emergence of EVs potentially challenges the very concept of a vehicle supposed to be powered by gas (Notar 2018). Therefore, it further challenges the image of cars in the eyes of those who grew up immersed in glocalized car cultures.

Many environmentalists expect EVs to become future auto transportation tools that promote sustainable and efficient living – a city mode called smart life. But achieving smart life requires constant negotiation and flexible cooperation among scientists, engineers, investors, marketers, consumers, and policymakers supporting multiple types of car industries. With the emergence of these new-energy vehicles, the comparison and negotiation between them and ICEVs should be scrutinized to understand further how the cultural values in cars affect the construction of smart life and smart private automobiles.

Instead of analyzing the values in a more unified car cultural community, this study investigates the consequences of the collisions between individuals supporting different types of cars. The collision is caused by different approaches of individuals while evaluating values for different types of cars. Through an ethnographic study of individuals related to or passionate about automobiles, I apply Anna Tsing (2011)'s concept of friction to substitute "tension" and address the following four questions: 1. How are various social and cultural values for cars interpreted by supporters for ICEVs and EVs? 2. How do these supporters create exclusive social cohesions by manipulating these values? 3. How is friction produced through interactions between and within these social cohesions? And 4. How does friction affect the future smart private automobiles?

I argue that individuals related to or passionate about automobiles develop social bonds in controversies between EVs and ICEVs. Here I identified five values that are used for describing cars in the Chinese context: "intelligence," "environmentalism," "progressive nationalism," "mechanical structure," and "nostalgia." These five values shaped my informants' perceptions of EVs and ICEVs and constructed the contradictions through culturalized discourses. Such contradictions reinforce the social cohesion of each type of automobile and create what Tsing (2011) calls: "friction" to the imagination of future transportation in smart living. The more vigorous friction is observed when the social cohesions debate more intensely in a particular value. The more vigorous friction also leads to the stronger hegemony of taking over each other in the imagination of future transportation. Therefore, this social cohesion evolves to become hegemony in competition to overturn one another in this study.

To help achieve the ultimate goal of manufacturing sustainable private automobiles and developing smart transportation, we need to analyze the friction and hegemony in competition between EV and ICEV supporters. By coordinating the social cohesions of EV and ICEV supporters, we should recognize the divergence, mediate the excessive hegemonic thoughts, and perceive creative approaches to solve the sustainable puzzles by utilizing the friction in these multiple car cultures.

Below I will thoroughly introduce the concepts of friction, smart city, and hegemony in competition (competing hegemony). In the Data Analysis section, I will illustrate how these concepts are worked into the tensions of the individuals by defining the properties of the five values.

Literature Review

Tensions and Friction

      Spaceship in the Desert (Experimental Futures) (2019) is a book strongly associated with my project as it examines the complex tensions produced while developing a sustainable future. This book describes the tensions and complex interests produced by groups of students, engineers, designers, and governmental facilities during the construction of the eco-friendly city, Masdar City. Masdar City is an ambitious project by the government of Abu Dhabi that seeks to explore long-term sustainable living strategies. The government of Abu Dhabi knew deeply that their oil wealth would not last in the long term. Hence, they developed the project of Masdar City in 2008 (Günel 2019, 62) and aimed at constructing a "status-quo utopia" (Ibid., 63) that incorporates high-end technologies and urban designs to sustain the well-being of humans. Gökçe Günel (2019) used the term technical adjustment to analyze the heterogeneous goals generated by the group of people who built Masdar City (Ibid., 28). "Technical adjustment" refers to the claim of manageability of climate change through complicated technology development. Günel (2019) argued that technical adjustment intends to extend humans' existing lifestyles in the future by regulating resources to tackle environmental issues (Ibid., 28, 31). This term further shows that the developers of Masdar City refused to examine climate change as a politically complex problem that requires ethical and moral discussions and negotiations of human living. Gökçe Günel (2019)'s work shed light on the issues related to the complicated situations between fossil fuels and future sustainability. She argued that the future is never a utopia or a dystopia, but it's always in between (Ibid., 184). Nevertheless, what Günel (2019) illustrated was a completely newly-designed city that is independent of the already-built urban space. This city, even though it inherits the existing ideologies of "what is considered better living", involves fearless scientific imaginations of the future.

The manufacturing of future sustainable automobiles is both different and similar. Shifting to the production of EVs does echo a utopian future of transportation. Yet, there is no blank slate utopia for pure technical adjustment. The manufacturing of future sustainable automobiles has to combine both sentimental and technical values and fit as much as possible into the existing urban spaces. The "utopian transportation" in the context of a smart city should be constructed with efficient use of resources during the constant process of resolving problems from technical and sentimental values. The whole system should be well-fitted into the Chinese society with minimum waste and disturbance of people's life. Therefore, the tension between "whether and how to stay in the existed model or move forward" is more overtly revealed.

Instead of solely calling this complicated and paradoxical phenomenon "tension," I prefer to apply Anna Tsing (2011)'s "friction" concept for a more forward-looking description. While tension[2] successfully implies contradictory and stressful relationships between actors, it takes a more ambivalent stance in signifying the reproduction of new conditions. Instead, Tsing's "friction" concept contains both definitions for "the description of the relationship" and "its products." It is helpful because "friction" argues for the production of new values. Friction emphasizes: "the awkward, unequal, unstable, and creative qualities of interconnection across difference (Tsing 2011, 3)". Friction is constantly formed in the collision of cultures and promotes the creation of new cultures. The making and unmaking of new values are often detected in the conversations of my interviewers. While Tsing (2011) summed up how friction creates diversity and conflicts that sometimes work to promote developments, here I depict a picture of when friction could potentially lead to the blockage of new values.

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[2] https://www.merriam-webster.com/dictionary/tension

The reason that friction causes the blockage of new values is the production of excessive hegemonies among communities. Tsing (Ibid, 5) explained: "friction reminds us that heterogeneous and unequal encounters can lead to new arrangements of culture and power." When this situation comes and experiences different unstable stages, it "both make[s] and unmake[s] hegemony (Ibid, 6)". It is vital to acknowledge how friction makes hegemony. Friction causes hegemony through conflicts between and within constructed social cohesions of people with similar identities and values. Hegemony is dissected later in the literature review, and its consequences are analyzed in the "Data Analysis" section.

Overall, Günel's work (2019) provides a brilliant concept, "technical adjustment," to describe the process of creating smart urban spaces. She also offers useful empirical summaries of the heterogeneous views to reveal the tensions in shaping the ideologies of sustainability and building an unreachable and almost interminable construction of smart cities. In addition to Günel, Tsing's concept (2011) of friction further fulfills the definition of tension while entailing the hegemony within it. Inspired by both scholars, I intend to narrow the focus to how friction affects the creation of new private automobiles. Borrowing Tsing's concept (2011) of friction, I plan to understand the competition in defining private automobile cultures and how it relates to smart urban spaces/smart cities. The following sections summarize the concept of smart cities and hegemony and their functions in this paper.

Smart Cities

"Smart city/Smart cities" is frequently discussed in my fieldwork. My informants used this concept to construct and deconstruct a futuristic city that will utilize machines to make cities more efficient and beneficial for human survival while protecting the environment. This study

examines future smart private automobiles, an integral unit in smart cities and smart transportation.

The original intention of the smart city is to apply information technology to solve the trouble of city life effectively and to control the pollution, disease, and other problems caused by technological progress. It tends to always fill up with future expectations of progressing computation visions bettering the livelihood of human beings and preserving the environment. The concept was first mentioned in 1992 (Rostow 1992, 17) when W.W. Rostow proposed the idea of a city with high-tech innovation within an efficient global network. In China and the US, the smart city is promoted by political and marketing approaches. CRRC[3] establishes plans (CRRC n.d.) to integrate data and core network into regulating the logistic transportation to enhance city efficiency and control pollution. In 2008, IBM's Smarter Planet project attempted to help countries build cities based on "instrumentation, interconnectedness and intelligence" (IBM100 n.d.). Such cities can become more productive, efficient, and responsive to public needs and infrastructure (ibid.).

Yet this sense of relying on technology to improve well-being has often been questioned. The acknowledgment of smart city is instead diverse and most often hazy. Adam Greenfield (2013) is one of the scholars to criticize the current smart city concept for an overemphasis on the roles of technology and information collection, therefore, asserting a very determined future. He argued that the coordination of people's living through the technology system can only benefit particular citizens whose behaviors are quantifiable and preferred (Greenfield 2013, 64, 90). For example, a smart city might only allow people who enjoy mass-produced products to benefit from lower prices and stable qualities. Those who prefer crafted products might

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[3] A Chinese state-owned rolling stock and locomotive manufacturer. The manufacturer also manufactures electric buses and electric drive system (CRRC: http://en.evcrrc.com/).

experience difficulty in obtaining the desired lifestyle because data ignores them. Because of this peculiarity of a smart city, marginalized people or cultures are exposed to the risk of being "unrecognized" and "ignored." Therefore, the imagination of a smart city seems to create a future that is only suitable to a particular culture and a way of living.

What is worse, as Greenfield points out, is that smart cities are "overspecified" (ibid., 42). With planned and complex networks installed as the fundamental structures in smart cities, the roots of cities are much more difficult to evolve and react to the changing services. The imagination of smart cities is creative thinking about urban planning and city life. However, Greenfield believes that it fails to realize the initiative and wisdom of individual human beings (ibid., 90).

This perplexity of the smart city appears in the conversations with my interlocutors. Beyond sounding plans of CRRC or IBM, the smart automobiles' technical and sentiment problems and controversies are manifold. And these problems are represented in the evaluation of values on types of cars for the development of smart automobiles – an essential part of smart cities. Along with the concept of friction, I tend to look beyond the scope of Greenfield and seek to understand how people's positionalities affect their imagination of smart cities.

Hegemony and Competing Hegemony

The term hegemony is used in my work to describe the process of dominating the private automobile sector through alternating cultural values. Hegemony or cultural hegemony was developed by Marxist Antonio Gramsci (1971) to explain how capitalistic society maintains control through the hegemonic culture by making the working-class associate their values with the values of the bourgeoisie. This is similar to the process in my research that individuals in

either EV or ICEV groups subconsciously seek to dominate their values over the other group.

The imposition of values by the dominant groups to become "common sense" for smart auto

transportation in a capitalistic society leads to the "uncritical and unconscious way of perceiving

and understanding the world" (Gramsci 1971, 625). Therefore, such commonsense limits

individuals in car cultures from alternative types of driving and leaves them invisibly coerced by

the hegemony of the dominant values.

Automotive hegemony is a more precise term for this phenomenon to illustrate the

coercion of car cultures. In Stefan Gossling's work, automotive hegemony refers to making

automobility "a norm" in society so that citizens are unable to "carry out basic daily activities

without a car" (Gossling 2017, 3). In places where cars are normalized with particular ideologies

in the automobile transportation system, consumers form common sense on "how cars and

commuting by cars should look like" and normalize problems such as congestion and increased

level of anxiety (Runa & Patrick 2021) associated with private car transportation. This

subconscious process of forming commonsense on private automobiles and commuting

experiences is commonly observed in my research to produce values that categorize cars. This

commonsense led to people's dependence on cars and ultimately to automotive hegemony. An

example of such automotive hegemony can be found in the popularization of carbon-heavy

ICEVs. As Timothy Mitchell (2009, 409) noted, US oil companies promoted the construction of

carbon-heavy lifestyles by urging families to obtain strong yet wasteful V8 engines to maintain

oil prices and profits strategically. The example reflects that the entire American car culture and

the dream of American muscle cars are founded on the hegemonic culture, which ultimately

benefits the interests of the capitalists. Automotive hegemony indicates the cultural domination

of types of vehicles for capital prosperity. This is an insightful concept to summarize the

domination process in my research. However, the problem with automotive hegemony is that it generally refers to particularly definite domination by one powerful ideology. Both cultural and automotive hegemony lack the expression of competition.

To better illustrate the domination in a transition period of private vehicles, the fluidity of hegemony should be strengthened besides this subconscious process of domination. Here I call the value-construction process of my informants a process of competing hegemony. I argue that because my informants utilize these paradoxical and defined values to contend for the dominance of either EV or ICEV culture, there is a sense of competing over other car types from critiquing values and ideologies.

Methodology

In this study, a total of 19 Chinese people related to the automobile industry were interviewed using the method of an ethnographic study. These people are insiders either knowing the cars' mechanical and software components or the cars' sales and investment situations. Interlocutors comprised EV and ICEV salespeople, investors, knowledgeable buyers of vehicles, and engineers. I also interviewed several ICEV automotive media personalities.

My primary method for this study is conducting semi-structured interviews with my informants. Besides this, I conducted some informal return interviews on Zoom, WeChat, and face-to-face. Interviews ranged from one hour to two hours. Interview questions covered the personal experience with cars, activities related to cars, understandings of the value of cars, interpretations of recent upswings in EVs, apprehensions of ICEVs, futurity, and views on those espousing different technology. I attempted to interview ICEV and EV proponents/practitioners respectively, to clarify conflicts between EV and ICEV proponents/practitioners. All the

information is kept anonymously. In the following analysis, I randomly chose the term names in "the 24 solar terms" from the ancient Chinese calendar as pseudonyms for my informants.

To analyze my interview data, I mainly adopted thematic analysis (Kiger & Lara 2020) and used Nvivo to sort meaningful words. I primarily used an inductive approach for the first half of the interviews to determine my research's general direction. The inductive approach helps explore potentially unrecognized patterns or correlations because it is not restricted by the previous theoretical grounds (Braun & Victoria 2006). Yet, it can sometimes be challenging to summarize the exact or specific values if the interviews become too discursive (ibid.). Hence, after finding the frictions between EVs and ICEVs, I investigated the background of Chinese car culture to help me better narrow down the cultural values during sorting.

Data Analysis

The primary goal of this part is to analyze these five values: "intelligence," "mechanical structure," "progressive nationalism," "nostalgia," and "environmentalism," which are highly associated with China's smart private automobile and frequently appear in conversations with my informants. For the first section, I present a brief history and policy overview of China's Automobile Industry. This overview entails a general situation and China's current strategies for ICEVs and EVs for automobile development. This overview aims to illustrate the background of cultural friction around vehicle types and undertake a comparative analysis of the values of ICEVs and EVs promoted by the government and by my informants. Some of these values discussed in the overview were taken as preset qualities to types of cars and were compared throughout my research. For section two, I present sample conversations to summarize how each value is evaluated by EV and ICEV supporters. In section three, I analyze this reinforcement of

social cohesion: the community alliances to specific values constructed in my research. I argue

that more robust social cohesion is produced when supporters are less suspicious of these values.

In practice, therefore, I observe stronger social cohesion among EV supporters. In section four, I

discuss how and why the social cohesions produce friction in each value. Section five outlines

how friction and social cohesions develop excessive competing hegemony that leads to

significant information asymmetry, which blocks the production of creativity in making smart

private automobiles.

An Overview of China's Automobile Industry

China's traditional automobile history can be characterized as striving to catch up with

the automotive industry of developed countries. Since automotive technology developed in

China much later than in many other countries, many scholars have discussed Chinese car

production as involving backward technology and poor quality (Chang, 2003; Shao, 2021; Wang

et al., 2014). An article citing the "Comprehensive Analysis of the Automobile Industry in 1999"

shows that (Feng n.d.), as of 1999, the development history of China's automobile industry can

be divided into three stages: the stage of starting up after the Great Leap Forward; the stage of

introducing foreign technology into Chinese automobiles; and the stage of concentrating

domestic investment to stimulate the imitation of other countries' cars by manufacturing

companies[4]. Even though many efforts have been devoted to manufacturing ICEVs, domestic

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[4] In the first stage, China's automobile varieties had become rich and diverse, but the investment was very scattered. Therefore, it has failed to develop a core automobile brand, and the consequence was that China is unable to create new products and manufacture parts independently of the imported car companies. The second stage: Exploring and growing stage: Under the planned economy, China has built the No. 2 automobile factory (now Dongfeng Group). It was capable of independent design, manufacture, and R&D. However, due to the external closure and the constraints of the planned economic system at that time, although the volume of the automobile industry increased, the technical level and cost were still lower than those of other countries. The third stage is rapid and comprehensive development: After gradually entering the reform and opening up, Chinese automobiles have become more diversified to meet the market demand, and they vigorously developed private passenger cars. At the same time,

cars still cannot compete with cars made in developed countries[5]. According to J.D. Power (2021), an authoritative car evaluation agency, in 2021, Chinese independent manufacturers had an average of 426 quality problems per 100 vehicles, while Japanese independent manufacturers had an average of 135 quality problems per 100 vehicles. From 1999 to 2021, the development of domestic conventional automobiles, once regarded as a national industry, was like the men's soccer team in China that has been defeated repeatedly even with high investment and attention. Internally, consumption of domestic and imported cars reflects class divisions (Wang, 2016), while externally, China's automotive sector is seen as a manifestation of the backwardness of the national industry. Therefore, for China, coupled with the gradual scarcity of petroleum (Mitchell 2009), the changes in mining technologies and methods (Günel 2019, 19), and the relatively sufficient and low-cost supply advantages brought about by the nationalization of electric energy (Chatterjee 2020), the future of domestic EVs seems to be much more promising than keep trying on ICEVs.

The development of domestic EVs mainly stimulates the improvement of technology, product layout, and purchase through policies and subsidies in today's situation. Encouraging the growth of EVs is not only to revitalize the national auto industry but also to open up the new energy market, provide ideas for energy supply with multiple energy sources, promote environmental protection (People's Daily 2022), and create an integrated automobile transportation network that utilizes computer intelligence. The entry of EVs is undoubtedly a significant investment for Chinese ICEV companies that have not even fully established

China currently holds more than 300 technologies by strengthening independent development and introducing foreign technologies. However, as the author Feng Fei (n.d.) pointed out, despite the capability of independent research and development at that time, the technical performance of domestic cars was still inferior to foreign brands.

[5] Analysis shows that the reasons domestic cars are concentrated in low-end models because: fuel consumption is 10% - 30% higher, failure rate mileage is 90% lower than foreign cars, and is heavier than foreign cars. (Feng, n.d.)

themselves. For example, additional funds must be invested in developing new energy, intelligent network connection, digitalization, and other technologies (SAIC Motor 2021).

The policy has played a pivotal role in developing EVs in China (lawinfochina 2020). The actual development and promotion of EVs in China are considered a policy stimulus that started in 2009 (Long 2021, 7). New energy vehicles and energy saving are planned as strategic emerging industries in populous China (Li 2010). In 2009, China implemented a series of policy systems to stimulate the development of EVs. For example, the six categories[6] aim at constructing a complete environment from consumers to manufacturers and from infrastructures to technologies for the prosperity of EVs.

This series of measures has indeed promoted the popularity of EVs. Early major domestic new energy brands only included BYD, Shanghai Auto, and Geely Auto (Li, 2010). By 2022, domestic new energy brands, especially EV brands, have reached a state of contention. Due to the national lockdown brought about by the coronavirus epidemic, a surge in consumption of domestic EVs is observed[7] (Xinlangkeji 2022). Through the comparison of the sales volume of BEV (EV), and ICEVs from May 2019 to May 2022 (CPCA 2019, CPCA 2020, CPCA 2021, CPCA 2022, Gov. cn 2022, People's Daily, 2022), we can see the approximate yearly growth rate of EVs and ICEVs among the four years. The data shows that ICEVs are becoming less and less favorable[8] to consumers. This shift can be attributed to the stricter control of emissions, the emphasis on sustainable development and environmental protection, and the construction of an

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[6] The former is divided into six categories: macro planning, promotion and application, industry management, fiscal and tax incentives, technological innovation, and infrastructure. These six areas include stimulus measures ranging from planning the development of the national auto industry, subsidizing buyers, subsidizing consumers, subsidizing charging stations, and technological innovation incentives (Ma et al., 2018).

[7] the coronavirus epidemic, which has restricted the import of domestic ICEVs and is favorable for self-produced and self-sold EVs, is viewed to help stimulate the EV consumption from 4% to 15% of the country's new cars selling (Xinlangkeji 2022).

[8] Gasoline vehicle sales went up again in 2021, but, from 2019, the general trend shows that electric vehicle sales are achieving more rapid growth, while ICEVs are gradually becoming less favorable.

ecological network for new energy vehicles. From 2017 to 2022, the central government issued

several documents[9] to promote EVs as green vehicles (NDRC 2022, 11) and integrated mobile

smart spaces (Xinhuanet 2017) for the long term. Overall, we can find that EVs are regarded as a

convenient, intelligent, low-cost, and relatively environmentally friendly existence under the

promotion of policies.

The development of EVs and the development of ICEVs should not be opposed to each

other. However, with the rise of nationalist sentiment and the yearning for smart cities, the

development of EVs and other new energy vehicles is regarded as an opportunity to "change

lanes and overtake the other countries' more developed auto industries" (Cao & Wu 2022).

Because of these great aspirations for EVs, the ICEVs were gradually labeled as traditional,

outdated, unintelligent products (J.D. Power 2021). These collisions and competitions of the

cultural and social values attached to the two types of models are also fully reflected throughout

my conversations with informants.

The Five Values

Relevant to the history of Chinese automobile development, here I draw the five

fundamental values that have led cars to become sites of friction in Chinese car cultures. These

five values are divided into horizontal and vertical groups. The horizontal groups include

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[9] the General Office of the State Council issued: "Opinions on Further Unleashing Consumption Potential and Promoting the Sustained Recovery of Consumption", showing that green consumption should be vigorously developed, and energy and product recyclability should be strengthened (Policy Research Office, 2022). In response to these initiatives, an "Implementation Plan for Promoting Green Consumption" shows that it is necessary to take the lead in promoting the procurement of new energy vehicles by officials of state agencies, institutions and other public institutions, and continue to provide tax-free and low-cost attraction policies, and strengthen policies such as charging and swapping stations. infrastructure to guide off-peak energy storage and electricity consumption (People's Daily 2022). In 2017's "Medium and Long-Term Development Plan for the Automobile Industry" (Wu 2017), the form of automobile products is about to transform from a means of transportation to a smart space that can be combined with internet technology -- becoming an integrated mobile smart space.

technical and sentimental values. For technical values, there are "intelligence" and "mechanical structure"[10]. For sentiment values, there are "progressive nationalism" and "nostalgia." "Environmentalism" is more complex because it contains people's emotions and societies' technological development. It is thus in between the technical and the sentimental values.

While all of the values would affect the future of sustainable automobiles, these values also signify how the future is related to the past and present. "Mechanical structure" connects the past that is tied to the stages of developing cars from solely mechanical to the present gradual transition into the software. "Progressive nationalism" is reflected on the past disappointing experiences with the conventional automobile industry, which connects to the present and future desire to develop powerful automobile industries. "Nostalgia" reminds individuals about the car cultures and family histories of cars. It affects people's emotions about cars in the present and the future. Finally, "intelligence" and "environmentalism" imply future changes that would advance people's living experiences. These two values compare the present (less developed) to the future (more development and positive changes).

Intelligence

"Intelligence" is a very controversial technical value in the social value of vehicles. When EV supporters/practitioners discussed EVs and looked forward to future smart cities, they often mentioned "intelligence" and emphasized its exclusivity to EVs. The proponents/practitioners of ICEVs clearly expressed their distrust of "intelligence" or directly challenged the concept of confusing "intelligence" with EVs.

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[10] Mechanical structure refers to a car's lack of excessive computer interference, computer dependence, and battery management system (BMS). This separates conventional cars from electric cars.

In the eyes of EV enthusiasts, "intelligence" is a value attached to the comfortableness of EVs. As the product manager of an EV manufacturer, Qiufen is about to own his first EV. He sent me a copy of Roland Berger's "Auto Smart Cockpit Development Trend White Paper" to demonstrate the importance of "intelligence" in EVs. He added:

> After work, you simply park the car in your parking space and plug the charging gun up. And then you can set it to charge itself when the electricity price is low, so it becomes very convenient to replenish energy without wasting time driving to the gas station. Moreover, the advanced driver-assistance system in EVs is relatively more prominent (compared to ICEVs) so that you can release from the more stressful driving process or take some time to do what you want. Another function is intelligent voice assistant, performing activities such as greeting you and actively recommending news (Qiufen).

Qiufen believed that the outlook for the future should be bold and full of expectations, such as having EVs as smart spaces that are constantly in effective conversation with the environment and humans. Therefore, the problems EVs are solving are not only the energy problem but also the redefinition of automobile transportation systems from mechanics to software.

The development of EVs heralds a more competent and efficient future, inseparable from the fact that EVs can always maintain electricity supply. Qiufen said: "An EV is like a cat taking a rest. Because it is always online, it can respond immediately to any environmental movement. At the same time, because EVs have a real-time power supply, if one day it needs to be automatically driven for maintenance, it is better than the ICEVs, which need to be wakened from sleep. And an ICEV is like a snake in hibernation, unable to respond to the outside world."

Many interviewees who supported EVs agreed with him. An EV engineer believed that the real-time power supply of EVs makes EVs more intelligent than ICEVs. And a person who

works in an energy investment bank said: "The software development of EVs is a trend and the second stage of the development of EVs in China in the future. As the self-driving mode that will dominate in the future, EVs will cooperate with Intelligence suppliers, such as Huawei. And because ICEVs are not powered by electricity, they cannot have 'intelligence' alone."

The proponents of ICEVs, in contrast, unexpectedly found fault with the supposed "intelligence" of EVs. When I asked how to view the fact that EVs can enhance the ability of cars to "communicate" with people, Xia Zhi, a mechanical engineering graduate experienced in fixing automobiles, retorted: "'Intelligence' does not necessarily have to appear on EVs. It just happens by accident that leads to this correlation. It may also be said that this phenomenon is a gimmick, a kind of marketing to make everyone more curious about EVs. From a technical point of view, "intelligence" and EVs do not have to be fused. All we need to do is enlarge ICEVs' battery capacity to achieve their computer intelligence." Practitioners of ICEVs confidently believed that the realization of 'intelligence' has nothing to do with EVs and quoted many related examples, such as high-end car models that come with massage seats, a series of ICEVs that reached the same level of automatic driving as Tesla, and the Audi A8 which surpassed Tesla's self-driving level.

The debate about "intelligence" is primarily around whether the idea of smart space and voluntary communication between cars and people are solely workable on EVs. It represents a technical development, or in Günel's words (2019), "technical adjustment" in the future. EVs are considered the ultimate products by their supporters for technical development. Leaning on the term "intelligence," EVs are masked with a sense of futurism and sci-fi. Comparatively, the value: "mechanical structure" represents an almost obsession with the past. This sense of obsession is dichotomized in the evaluation.

Mechanical Structures

EV proponents/practitioners thought ICEVs are backward. They gave the "mechanical structure" an old-fashioned outer look. On the other hand, the proponents/practitioners of ICEVs regarded the "mechanical structure" as a sign of safety and industrial maturity.

Automotive engineer Chunfen said: "EV manufacturers are neglecting mechanical engineers, and they seem to be turning to electrical engineers or software engineers to make all aspects of driving autonomous."

EV supporters/practitioners illustrated that the "mechanical structure" of ICEVs is not qualified for "intelligence." The "mechanical structure" is "fixed, dead" and cannot be personalized. Qiufen used to work in an ICEV company before turning to an EV company. Therefore, he had some experience in both fields. He said: "In fact, I think the past ICEVs are limited to the mechanical level or the level of people adapting to the machine. We are turning to the concept of the machine serving people, or the level of the machine to adapt to the human level." EVs are "mobile, fluid" and can be adjusted to satisfy personal needs. A consumer who drives both an EV and an ICEV told me, "The intensity of the power recovery of the EV's power pedal can be adjusted at one's will." He also mentioned that the four wheels of EVs could be controlled individually because they are controlled electrically. In this way, it is not easy to slip in extreme weather. The logic is much more straightforward and more reliable than even the relatively advanced all-wheel drive in ICEVs.

However, Mangzhong, who works in the high-tech industry, believed that EVs are still an emerging and unstable state of experimentation: "An EV is something specially controlled by computer circuits. I don't particularly believe in these electronic products. I think they probably

have a higher rate of failure than that ICEVs. Machinery is much higher. Although I am in the high-tech industry myself, I think the more people who engage in these things, the less they believe in them, so I think mechanical structure is the most reliable thing." "Dead" things are structurally stable, have a long development history, and can detect problems easily. Hanlu, an ICEV enthusiast, said: "If the ICEV breaks down on the road, such as emitting smoke or something, I will take it down and find a technician to fix it easily. And if it's not a big problem, I may be able to solve it myself." Electronic products are considered to be fire-prone if operated improperly. Therefore, EVs need specialized mechanics for maintaining and fixing. Because there are currently few EV maintenance departments, EV drivers also seem to face more challenges in maintaining and repairing cars.

The values "intelligence" and "mechanical structure" illustrate the conflicts between vehicle knowledge and the paradoxical angel of viewing technologies. The debate of these values is around the technicity of these vehicles. Yet, technicity cannot cover the whole picture. Below, I will discuss values that are sentimental.

Progressive Nationalism

"Progressive nationalism" is a sentimental value strongly associated with the problematic situation between domestic EVs and ICEVs in China. As the overview demonstrates, ICEVs are regarded as inferior, while EVs are believed to endorse the potential to surpass world-class vehicle manufacturers. The EVs are symbolically represented as a new fashion for national pride.

This part presents opinions on "progressive nationalism" in EV and ICEV supporters. For both supporters, this sentimental value seems to favor EVs more.

"If China is limited to the option of manufacturing ICEVs, Chinese car companies will always be in a backward position, and it will be almost impossible to occupy the market of mid-to-high-end vehicles. But if we can promote new-energy vehicles, we can change this status quo (Daxue, an ICEV supporter)."

"Progressive nationalism" has played a considerable role among proponents of EVs—it fuels EV practitioners' imaginations of a future dominated by EVs. As a Ph.D. in automotive engineering, Daxue believed China's EVs could revitalize national enterprises. Working in an investment bank and often needing to contact people in the EV industry, Liqiu held a similar opinion. She said: "China introduced Tesla to provoke the catfish effect, to trigger the competition of Chinese EV, and to make them do a better job of overtaking other companies." She gave me the example of CATL (Contemporary Amperex Technology Co. Limited) to prove China's globalized technology of electric batteries. She said that CATL stood out in the early rounds of the competitions. Furthermore, after the scale of CATL increased and China's policies strictly controlled the quality of batteries, it also supported many of today's relatively large Chinese listed companies. She informed me that the current CATL provides lithium iron phosphate batteries to many EV brands, including Tesla. All of this makes CATL an excellent globalized Chinese company that the Chinese need to be proud of.

As China is eager to return to the status of a powerful country, the rapid development, patriotic education, support, and promotion for the local development of EVs are essential. Therefore, national pride and nationalism are critical sentimental values associated with EVs.

Nostalgia

After speaking about "progressive nationalism," "nostalgia" has to be mentioned. If "progressive nationalism" is regarded as a value particularly for EVs, then "nostalgia" lingers in the community of ICEV supporters. ICEV supporters defined "nostalgia" as an "authentic way of driving" because of the manual ICEVs' relatedness to the original sound, power, motions, the past sports-car era, and the long-developed conventional car culture.

Most proponents of ICEVs saw the car as a connection to their parents. Because China's private auto industry is relatively young, the parents' generation of these ICEV supporters considered driving fashionable when cars and car culture had just become prevalent. Shuangjiang, an automotive engineer, said: "I remember that the CCTV broadcast environment in China was very beneficial at that time. In addition to F1, CCTV also broadcasted WRC[11]. So, at that time, I knew that there were all kinds of car racing. My mom's Subaru Forester STI was the first car I learned about fun in driving. After performing well in the secondary school entrance examination, my father rewarded me with driving a professional karting event. When I was a child, watching these races with my dad and my mom's Forester made me want to buy a more advanced Subaru when I grow up." For Shuangjiang, the ICEVs represent the emotional connection with his dad and the desire to drive a race car like those racers on TV. Thus, the vehicle inherits emotions, extending the parent-son relationship and family bond (Latimer & Rolland 2006). The car journalist, Dashu, said: "When I was a child, I didn't have many friends. So, I regarded my parents' Citroen ZX as a friend. Before it was turned in[12] [to the government], it taught me to shift manually and took me to and from school every day. I still quite miss it." Similar expressions of emotion are common among proponents of ICEVs. ICEVs have been

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[11] F1 and WRC are popular car racing events featuring track racing (F1) and rallies.
[12] China has laws to reinforce compulsory scrap of motor vehicles. The detailed reference can be found here: "Law of the People's Republic of China on Road Traffic Safety." npc.gov, 2007.
http://www.npc.gov.cn/zgrdw/englishnpc/Law/2007-12/05/content_1381965.htm.

endowed with the role of cultural inheritance and cultural extension in the development of society and culture.

For EV supporters, there are also some degrees of confusion and indeterminacy in "nostalgia." While many EV supporters ignored or admitted that "nostalgia" is a more qualified value for ICEVs. Some EV supporters argued that "nostalgia" would develop along with the increased consumption of EVs. For example, Lichun, a software engineer familiar with both EVs and ICEVs, told me that because the scale of consuming the EVs is not large enough, the EV cultures are still relatively narrow. With more people buying the cars, EV enthusiasts will form their particular cultural identities and attachments distinct from ICEV enthusiasts. Just as Qiufen illustrated, there are possibilities that EVs might construct their own third-space cultures.

Environmentalism

Unlike the above sentiment values or technical values, "environmentalism" is a future value that is both sentiment and technical. Additionally, it is a value that leads to friction among policymakers, EV supporters, ICEV supporters, and communities.

As noted previously, the governmental promotion of EVs involves the rise of a "greener lifestyle." The policies suggest that electricity is more environmentally friendly and helps reduce cost and energy waste in the future. However, my informants from both sides challenge this very promotion of environmental sustainability.

ICEV supporters took ambivalent stances on "environmentalism" because of the unforeseeable future. These people understood the environmental protection concept of EVs with the battery itself, the electric power supply technology, and the consumption of cars. At the same time, proponents of ICEVs also put forward the view that gasoline could also be more

environmentally friendly. Some individuals were critical. Mangzhong, who is a physics Ph.D., argued fiercely: "EV manufacturers claim that they are environmentally friendly because it uses electricity. But in fact, the materials of their batteries are very polluting to the environment and are not recyclable, so they are not that environmentally friendly. Saying they are environmentally friendly deceives consumers who don't understand natural science." While supporting Mangzhong's view that batteries may pollute land and water resources, Daxue added that since most power generation systems still rely on coal and oil, it is very unscientific to say that EVs are environmentally friendly. Responding to Daxue's concerns, Xia Zhi posed an inverted attitude to the environmental issues of EVs compared to the other ICEV supporters: "EVs use electricity at the end, which means that we can use different types of medium to generate electricity. Unlike gasoline which is already a raw material [cannot be generated by cleaner sources], whether it is burning oil or wind energy, electricity as secondary energy can at least provide the possible potential for environmental protection". From the perspective of consumerism, Dayu, who works in auto sales, challenged EV manufacturing and consumption by arguing that as long as people are buying new cars, their behaviors are not environmentally friendly. He added: "Over the years, the industrial progress of the ICEV and its lowered emission have made ICEVs very efficient and relatively more environmentally friendly. If we could modify the existed vehicles, will that contribute more to less waste?"

Surprisingly, although we may expect EV supporters to pro "environmentalism" and argue against the queries of batteries and power supply from ICEV supporters, those I interviewed clearly stated that they often perceived environmental protection as mostly a policy gimmick. An EV salesman said: "Environmental protection promotion in China is not working. Using environmental protection to attract Chinese people is impossible because Chinese people

don't have the luxury to care about the environment." An EV engineer, Dahan, told me: "Battery recycling can indeed help promote environmental protection, but nowadays we buy cars to satisfy our basic needs; who has the heart to care about environmental protection? Most people still need to consider their own food and shelter." What's more, similar to ICEV supporters, Jingzhe, who used to work as an EV engineer and now as an investment bank employee, described the difficulty of recycling batteries: "After automobile power batteries die, they are envisaged to be turned into energy storage facilities for high-voltage stations or transition devices for hydropower stations and wind power stations. But most of these plans failed because the end-of-life battery may only have 10% of its life left. Then the batteries lose more energy when re-used, so recycling automotive power batteries is one of the biggest environmental challenges for EVs because there is no exit [once the batteries are produced]. Your battery has been built and used, and you can only leave it there. There are no other ways to deal with it, at least until today."

The knowledge of "environmentalism" in private auto transportation is discursive in the context. This future value triggers confused controversy that leads to friction not only among, but also within EV and ICEV supporters but also between policymakers and them. For ICEV supporters, the debate of "environmentalism" mainly occurred in recycling batteries, supplying electricity, and consuming new vehicles. For EV supporters, the lack of faith in consumers' belief in a greener lifestyle is strengthened along with similar technical concerns like ICEV supporters.

Overall, these values are evaluated according to people's diverse perceptions and positions in cars. "Intelligence," "environmentalism," "progressive nationalism," and "nostalgia" all produce controversies for their connections from past, present to future. These controversies

lead to instability within the communities because members are not affirmative in attaching these values to one specific type of car. The only value defined arbitrarily is "mechanical structure" because it presents a dichotomized understanding of whether to keep or oust the ICEVs. The friction created through these controversies divides individuals into social cohesions within their supporting field. The social cohesions are loose or tight, depending on the members' degree of attaching these values to the particular types of cars.

Social Cohesion

In this research project, I observed that social cohesion is constructed through interactions between people who share particular interests and agreements on specific values. This part discusses how social cohesion develops among EV and ICEV supporters. I argue that the existence of social cohesion is vital in the production of friction and competing hegemony.

Community belonging and solidarity are formed through attending car culture-related events (Brownlie 2007, 114). In my interviews, I found that ICEV supporters are heavily involved in the car cultures and are frequently attending events such as car meets and track days. Chushu told me he would never buy EVs because he wanted to feel like a part of the car community. "When I once attended an Autocross event, a Tesla owner was also in that event. Some people gossiped and stared at him almost the whole time. A man told me: 'huh, there is this Tesla guy. He seems to be driving well. But he's so weird because he never talks to anyone.' EVs are assumed to be a weirdo in these events. People simply mock it by saying that while it is street legal, it needs a trailer to come and go home and cannot finish a day's races. Because it takes time to charge and often consumes its energy quick during races." The group belongings of ICEV supporters are constructed through these events, the isolation of other car types, and

senses of nostalgia. These behaviors deliberately shape the identities of ICEV supporters and their emotional ties and sentimental views of ICEVs. The attachment to ICEVs is developed because they are regarded as a bridge to reinforce social relations in the popular automobile cultures (Brownlie 2007).

Social cohesion is observed in EV supporters because of the charging properties of EVs. The need to share charging piles in an apartment complex leads to interactions among neighbors. Even though people engage with cars merely on their functional level, those who have EVs need to communicate more frequently with other owners in an apartment complex than those who have ICEVs. According to Xiaohan, the need to share charging piles made the neighbors spontaneously start a group chat to inform each other about the availability of charging piles. The initial objective was to share the charging piles more efficiently. Still, gradually this group chat became a place for more interactions, such as second-hand trading goods, asking if anyone could help take care of pets, etc. People in the group chat also discussed the problems of EVs and helped each other fix or find places to fix the vehicles. Xiaohan told me that once he met another EV owner in their apartment for the first time, they talked about many things like friends. He claimed that having an EV expands his social community and knowledge of EVs. In this context, EVs are considered a bridge to reinforce community ties and belongings.

The physical interactions create a sense of belonging and emotional ties to these car types. People develop and reinforce their knowledge about cars through interactions with individuals who share similar views on particular types of vehicles. These interactions might be why individuals supporting the same type of car are attached to similar values.

Therefore, the next part demonstrates how social cohesions are formed through evaluating the five values. It is more significant when more individuals with similar interests are

affirmative in concluding that a particular value positively belongs to the car type they support. It is looser and more critical when more individuals who support a particular car type are open-minded to conclude that specific value belongs to both types of cars.

According to the evaluation of the five values, the ICEV proponents are more intent on completely agreeing to "mechanical structure" and "nostalgia." ICEVs are viewed as a continuation and perfection of the past to the present, both sentimentally and technically. The sense of nostalgia asserts a romantic ideology to ICEVs, making them more challenging to move forward and transit to similar but new objects. The "mechanical structure" further fixes these people in a state of suspicion and distrust of EVs because of the preset idea that "mechanical structure" is more reliable and stable than fragile software. Hence, "nostalgia" and "mechanical structure" are two values attached to ICEVs to form bonds between ICEV supporters.

The other three values are arguably less defined in the views of ICEV supporters. For "progressive nationalism," ICEV supporters are more open to the potential of various types of cars. Maybe it is because the current development of ICEV was a bit regretful. People vacillate between ICEVs and EVs to promote "nationalism." The approach of promoting nationalism, whether or not to be "progressive," was also discussed. For example, Chushu described a new sense of nationalism: brands such as Wuling (五菱) and BYD (比亚迪) provide many low-cost cars for poor regions in other countries. These brands have helped those in the rural areas satisfy the most basic needs while having large storage spaces for cargo. But the government seemed to be not a fan of advertising these actions. Yet, he believed this should be propagated as an image of how Chinese brands help others. Chushu felt that nationalism should be openly realized. Nationalism is not only about promoting China's auto industry to manufacture top-notch or luxury cars, but also should be observed in more events, such as feeling proud of these domestic

car companies' boom in the less developed countries. Hence, he also admitted, "Who doesn't want to be proud of their own country? If EVs have the potential to stand on top of the mountains, then we should also support EVs."

For "environmentalism," the vacillation between EVs and ICEVs leads to the friction produced among ICEV supporters. As noted previously, this value supplies people with more imagination and unpredictability about the future. The knowledge gap is more significant in values as such. Besides, people's standpoints also affect how they view this value. "Environmentalism" is debated because of the inconsistency people apply existing information to estimate the future. Some ICEV supporters are suspicious of EVs' potential to be environmentally friendly because their knowledge about specific technologies, for example, battery and electricity supply technologies, is more pessimistic. But others took a more optimistic stance on these technologies. Some ICEV supporters, on the other hand, felt that this value, "environmentalism" itself suggests opposition to capitalistic consumerism. Some voices also indicated that the ICEVs are becoming more environmentally friendly. The hodgepodge in "environmentalism" reflects the individuals' knowledge gap and inconsistent starting points about EVs and "environmentalism," so internal friction is generated accordingly.

Finally, "intelligence" is defended by ICEV supporters to be a value that should be more openly observed. Similar to "progressive nationalism," "intelligence" is viewed as a middle ground for car types. The "sci-fi" future, in ICEV supporters' views, should not solely be led by particular car types. ICEVs could be developed, and equipped with computer intelligence that pushes communication between cars and humans. However, saying it does not mean they refute the "intelligence" on EVs. Just as Xiazhi and Shuangjiang both argued: "It has nothing to do with types of vehicles."

In contrast to the more vacillating status of ICEV supporters, the EV supporters are much more cohesive and assertive on values.

The three values "mechanical structure," "intelligence," and "progressive nationalism" are categorized into backward values for ICEVs and positive values for EVs (the latter two). Because the representation of EVs in governmental promotions asserts a futuristic and sci-fi view of private auto transportation, supporters hold tight to the future smartness and nationalistic belonging of the EVs. Comparatively, they constructed the backwardness of ICEVs further to illustrate the futuristic display of private automobiles.

Even though EV supporters generally have more complex feelings toward "environmentalism," these people still agree that the potential of EVs to be environmental-friendly will always surpass the notorious ICEVs. For example, Xiaoxue said: "Environmental-friendly should be a business for the top. Even though most people buy EVs because of their low cost, sustainability is promoted with more people buying EVs." These people view the mechanical structure and nostalgia as backward values. Lidong said: "Once a teacher of mine said manual vehicles are the only best. But honestly, his idea only represented a small number of people. Many people like me felt that even driving an automatic car is already cumbersome. Driving an EV with smart functions like Tesla's one-pedal design makes driving much simpler". Manual vehicles are considered intricate and too time-wasting to learn the maneuver. Such intricacy signifies a retarded backwardness of the machine because it is not entirely serving humans. Many people believed the future is in EVs. After reviewing the drawbacks of EVs, Xiaoxue said: "Even though it will be a tough and long process for EVs to take over, the potential is just there."

For EV supporters, the only value that contains some degree of confusion is "nostalgia." In the transitional period, EVs are relatively young compared to ICEVs' developmental history. Because of this, some EV supporters recognized "nostalgia" solely in ICEVs, yet others argued "nostalgia" would be developed throughout the time. In this case, "nostalgia" only appears when the particular automobile reaches the scale of production and consumption. For these other EV supporters, "nostalgia" is not quite mature nowadays. Thus, it is a value that connects the present to the future.

Overall social cohesion is created through people's interactions with other members who share similar values and preferences of cars. The first part of this section examines social cohesion in automobile popular culture and communities. It illustrates that people's interactions with other car supporters affect their knowledge and emotions about these automobiles. The second part shows that ICEV supporters attach ICEVs less to the five values. On the contrary, EV supporters were more committed to the values they recognized as EVs', such as "intelligence" and "progressive nationalism." They are also more coherent in asserting ICEVs' values, such as "mechanical structure." This observation, therefore, implies that ICEV supporters are less socially cohesive in terms of the five values than EV supporters.

Friction

According to the previous discussion, friction in the five values is generated through three conditions: the instability of the future, individuals' knowledge of the present, and the standpoint of the individuals within and between the social cohesions. The instability of the future is a preset condition before all the friction occurs. Because only in this transitional period where sustainable automobiles are not realized, there is potential for imagination. Imagination is

turned into friction because of the last two conditions that create knowledge gaps, leading to the almost incommunicable and unpersuaded attitudes between social cohesions or individuals.

Among the five values, "environmentalism," "intelligence," "progressive nationalism," and "nostalgia" are the most volatile. This is because all of these values imply the unpredictability and imaginability of the future. Additionally, "progressive nationalism" implies the past dissatisfaction, the present endeavor, and the future potential of China's auto industry. "Nostalgia" suggests the past cultural history of ICEVs, the current emotional attachment to ICEVs, and the future developed car cultures for ICEVs and EVs. As Günel (2019) illustrated, these values are built upon people's imagination of smart urban spaces. Individuals who try to adhere to these futuristic values make claims about their imagined sustainable auto transportation based on their present understanding of cars and China's situation.

How one's understanding of cars and standpoints affect their evaluation of these values is manifested in the ways they view "environmentalism." For example, those familiar with the consumers did not believe in "environmentalism" as a concern of the buyers. Those who work as engineers or in science departments questioned the technology and material in EVs for "environmentalism." Even though people all posed suspicious attitudes toward "environmentalism" for EVs and ICEVs, the inconsistent knowledge of these individuals and what they observe in their positions still lead to knowledge gaps among individuals.

These knowledge gaps among individuals are what create friction. For "environmentalism," not only do we see the friction between EV and ICEV supporters, but we also see it among individuals within the communities and between these car cultural communities and the policymakers. The knowledge gaps cause friction because the degrees of "affirming 'environmentalism' is a value for EVs or ICEVs" vary among individual members.

Many EV supporters and a few ICEV supporters felt that EVs might be the solution for the environment, even though they were not as confident as the policymakers. Yet, many ICEV supporters and a few EV supporters were concerned with the technologies, materials, and environmentally unfriendly lifestyles.

For "progressive nationalism" and "intelligence," knowledge gaps and friction are observed in people's inconsistent understanding of China's current automobile situation and capability of technical adjustment. EV supporters affirmed that these values are solely for the EVs, while ICEV supporters felt the need to view them more openly. This phenomenon can be explained in terms of the current conditions of China's auto industry and people's professional knowledge. On the one hand, the policymakers in China are drafting regulations that favor EVs. On the other hand, the domestic ICEV has been long stuck in technical difficulties. This might be why we observe the uncompromising attitudes of EV supporters and the vacillating attitudes of ICEV supporters in "progressive nationalism." For "intelligence," it seems that it's mainly the professional knowledge that leads to the debates. According to the previous overview, the computer intelligence in EVs has been widespread propaganda to promote EV sales. Nevertheless, similar developments in ICEVs are not as pronounced as in EVs and are solely recognized by ICEV supporters.

"Nostalgia" is a sentimental value to create friction because the standpoint of these social cohesions to vehicle types are diverse. ICEV supporters made claims about "nostalgia" based on their present and past experiences with cars, while EV supporters illustrated that "nostalgia" could be a value that connects the present to the future. The previous sections have discussed ICEV supporters' attachment to cars because of cars' relatedness to their family history and cultural belongings. This emotional attachment or nostalgia to ICEVs leads to the reluctance of

ICEV supporters to imagine a future with solely EVs. In contrast, for EV supporters, future

instability is magnified as a condition to realize the openness of this value. Similar to what ICEV

supporters do in "progressive nationalism" and "intelligence," EV supporters utilize the

instability of the future to argue for the extra potential of "nostalgia" in EVs. In this case, a

futuristic standpoint in 'nostalgia' by EV supporters collides with the past-present perspective of

"progressive nationalism" and "intelligence" by ICEV supporters.

Apart from the four values, "mechanical structures" is also aligned with the three

conditions to create friction. Even though it is associated with the past, it implies people's desires

in the future. For example, those who acknowledged ICEVs as backward products in the

developmental stage are also unwilling to think of the existence of ICEVs in the future.

Inversely, those who felt the "mechanical structure" signifies the maturity of technology and the

controllability of vehicles are more conserved in approaching EVs in the future. The senses of

backwardness, maturity, and controllability also display how individuals make use of their

professional knowledge and individual experience to determine the property of "mechanical

structure." Friction arises from the antithesis between the negative and positive depictions of

"mechanical structure."

This section elaborates on the previous discussions of values and social cohesions to

explicate why and how frictions are generated. According to Tsing's description, friction

produces erratic interactions (2011, 37). These erratic interactions are supposed to generate

fluidity and creativity. However, instead of producing the creativity for smart and sustainable

private automobiles, communication and negotiation are impeded by the knowledge gaps among

individuals, leading to a competition path. The last section discusses this competition between

EV and ICEV supporters to illustrate the excessive hegemony caused by the friction that might lead to inefficient development for a sustainable future.

Competing Hegemony

The excessive hegemony between EV and ICEV social cohesions is referred to as competing hegemony because these communities frequently want to take over each other. In interviews with EV supporters, I was aware that many intended to show the future of EVs by depicting a picture of when ICEVs collapse. This hegemonic depiction of the future is also prevalently aligned with factual references to current government policies and announcements, quantitative data on sales, etc. For example, Dongzhi told me that policies in China favor the promotion of EVs: "If saying that you have an ICEV, it will limit the days for going out because in Hangzhou if your last plate number [of the ICEV] is odd, you can only go out on odd days [, or vice versa]." Qiufen mentioned that the future would be in EVs because electricity is more abundant and cheaper than gasoline. In my conversations with ICEV supporters, they often illustrate technological facts and the costs to deny the potential development of EVs. For example, Mangzhong distrusted the controllability of EVs by explaining EVs' technical deficiency. Yushui depicted the impracticality of entirely relying on EVs in the future by explaining the extremely high cost of installing charging piles.

The competing hegemony is produced and reproduced through the sense of distrusting the other types of cars and deeply believing certain types of cars. Such distrust/deep belief went from technical distrust/deep belief to policy distrust/deep belief. The sentimental values, "nostalgia," and "progressive nationalism" further intensify the distrust/deep belief. On the one hand, people who supported ICEVs were skeptical of EV development. Therefore, they tended to

frequently reveal the indeterminacy in EVs' future development through "mechanical structure," "intelligence," and "environmentalism." This skepticism also extends to the distrust of policies. An ICEV supporter once said: "Policies are always changing because governmental officials rely on these policies to gain support and alliances." On the other hand, The social cohesion of EV supporters defended the potential of EVs, criticized the ICEVs, and allied with the policymakers. By expressing the generally pessimistic concerns about the five values in ICEVs, EV supporters are similar to ICEV supporters because they both wanted to prove the future superiority of the preferred car type. Because the current policies favor EVs, EV supporters generally held a deep belief in them. Even for the most controversial value, "environmentalism," EV supporters are more affirmed with the policymakers that EVs will ultimately help with sustainability. Such distrust/deep belief further intensifies the gap between these social cohesions. The competing hegemony implies a sense of taking over. The competitions are between the perfection of ICEVs vs. the progress of EVs.

However, solely pointing out that the competition existed does not tell the whole story. The degree of competing hegemony suggests the degree of distrust/deep belief in a particular type of vehicle. As noted, social cohesion is an essential identifier to this context. My previous analysis indicates that EV supporters produced more social cohesion and held more profound beliefs than ICEV supporters. EV supporters, therefore, produce more intensified competing hegemony against ICEV supporters. The implication is that, in a state of friction that involves instabilities and tension, excessive competing hegemony prevents a socially cohesive community from being aware of the reasons and logic of the other social cohesive community. Therefore, EV supporters are less open to negotiations of the values. Instead, their desire to overturn conventional private automobiles is stronger than ICEV supporters' desire to overturn EVs.

The production of creativity through friction requires constant negotiation of the tensions (Tsing 2011, loc 74). However, this project illustrates the potential obstacles to such negotiation because of either EV proponents' deep belief in the technical adjustment and policy support of EVs, or ICEV proponents' solid sentimental ties that led to a distrust of the technical adjustment of EVs and an opposing perspective of ICEVs.

Ultimately, because of the excessive competing hegemony, the attention of these socially cohesive communities is concentrated on inefficient competition instead of exploring the creative potentials in friction for sustainable automobile development.

Conclusion

This study sheds light on how and why friction is created in the making of the future private automobiles and provides an analysis of how excessive competing hegemony blocks the potential for negotiation and creativity between the social cohesions of car supporters. By summarizing the overview of China's auto industry and comparing the perceptions of EV and ICEV proponents on the five technical and sentimental values, this study explicates how the diverse ideas generated by different groups lead to friction. In this thesis, I identify three conditions for friction: the instability of the future, individuals' knowledge of the present, and the standpoint of the individuals. While friction should theoretically create new values or developmental strategies for future private automobiles through negotiation, I found that it failed precisely because the individuals in the automobile industry devoted too much effort to competing with other social cohesions. Both ICEV and EV proponents defended their positions by depicting the positivity in these values. The idea of a competing hegemony caused by eliminating ICEVs is also very pronounced for EVs. However, the fluidity of individuals'

perceptions should also be recognized. Individual perceptions are often not fully aligned in these social cohesions. Many ICEV proponents also defended the values of EVs. EV proponents also acknowledge certain positivity in ICEVs. Yet, in most cases, because the competing hegemony is too excessive, the willingness to negotiate and produce creativity together is impeded.

How will the sustainable and smart private automobile be achieved in the future? The future of these automobiles relies on the justification of both technical and sentimental values. Yet, the excessive competing hegemony is not the ideal solution to stimulate creative justification because it inversely blocks communication. The friction between automobile social cohesions could be a double-edged sword that should be realized and used carefully to generate positive developments in automobiles. Ultimately, this study wants to urge more attention to this inefficient communication that could potentially lead to more energy waste during sustainable automobile development.

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