

The Production and Presentation of Knowledge in Online Taxi Operations

-- An Areal Analysis of The Controversy Over The Safety of Online Taxis

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Abstract

With the rapid development of the online taxi industry, the issue of driving safety has become a growing concern and controversy. The objective of the study is to open up the "black box" of online taxi safety technology, examine the controversies arising from its technology, and analyse how knowledge about online taxi driving safety is produced in the construction of two social world discourses. This paper adopts a multi-subjective interview approach from the Science and Technology Studies (STS) pathway, aiming to analyse the reasons why safety technologies are questioned through the process of presenting controversies within the framework of a domain analysis. The results of the study revealed that there are negotiable and disputable boundaries between official knowledge discourse and common people's knowledge in specific technology implementations, and that the existence of disputable boundaries allows non-expert residents to form reasonable judgments and questions about authoritative knowledge in the face of expertise.

Keywords

STS; Areal analysis; Knowledge production; Boundary matter.

1. Introduction: The Fast-growing Netflix Economy and Its Problems

Over the past decade, China's economy has grown rapidly, the level of science and technology has climbed higher each year, new development models have emerged, and with them, the Chinese economy and the society that brings it have changed dramatically. Since 2014, with the rise of companies such as DDT and the popularity of the sharing economy model, the online taxi industry has grown rapidly in China and has become one of the main options for urban travel, with the number of online taxi drivers in China reaching 6.7 million by the end of 2022 (Sharing Economy Blue Book - China Sharing Travel Report (2022-2023)), with over 400 million users, making it an important transportation system in cities. However, there has been controversy over the safety of online vehicles. On the one hand, platforms have access to a wide range of drivers, which can lead to a mix of inexperienced and dangerous drivers who do not comply with traffic regulations, and on the other hand, platforms have tried to present technical aspects such as cameras, recordings, and safety score calculations to regulate and secure the safety of passengers to allay passengers' concerns.

Due to the expansion of the industry, the issue of safety of online taxis has attracted the attention of studies in the social sciences (Zhang, 2023; Hou, Deng-Hua, 2017; Lou, Qiu-Ran, 2017; Wang, Jing, 2016). These studies have more often explored the reasons for the frequent occurrence of online taxi safety problems, as well as studying countermeasure suggestions for

the safety governance of online taxis at the regulatory level. However, these studies have focused more on the safety issues of the online car industry and how to solve them, but have not studied why the safety of online cars has been frequently questioned in the area of online car driving safety. How is 'safety' defined and measured? And how do the technologies themselves relate to the creation of controversial issues? To achieve this understanding, it is necessary to look at the technologies themselves to see how knowledge about the 'safety' of online taxis is produced and what is at the heart of the controversies, in order to understand the social issues that arise from them.

The author hopes to understand the controversies over the safety of online taxis through an intersectional research approach that combines STS research paths and arean analysis. By using scientific knowledge and social co-production as a 'style', a single determinism can be avoided to understand more complex social phenomena (Jasanoff, 2004). This approach argues that scientific knowledge is not the only objective representation of facts, but is also a situational cultural practice in itself (Zhang Jieying and Li Xueshi, 2019). The producers of knowledge about car safety can have different actors, such as experts, passengers, drivers, etc., who have different understandings of car safety through their different perspectives, perceptions, technical experiences, and other direct or indirect experiences. This study seeks to open the black box of technology. This study attempts to open the black box of technology and examine how knowledge about safety in online vehicles is constructed through the discourses and actions of multiple parties.

The study examines how science and technology define and produce knowledge about the 'safety' of online car travel through a arean analysis of controversial technologies. How does this knowledge convince social actors, and if not, what are the central counter-arguments and points of contention, and how do the parties in this contentious process give legitimacy to the knowledge they produce. The following paper will explore the communication and exchange across different social organisations and actors in a given arean by introducing the concept of safety audit mechanisms as boundary objects, in order to gain insight into the production and translation of knowledge within the arean. At the same time, a arean analysis research method is used to better understand the mechanisms and practical effects of safety auditing mechanisms as boundary objects in a given arean, by taking the reader into the two social worlds corresponding to the safety of online cars and dissecting the knowledge production strategies of both sides and, based on this, answering the question of how knowledge is produced by both sides in technological controversies, especially by those who apply it and those who oppose it.

This study focuses on the safety audit mechanism of online dating, through the survey method of interviews, combined with the analysis of relevant mass media, professional knowledge literature and other materials. The ethnography is derived from conversations with online taxi drivers and passengers in Tianjin, and the author collected data through dozens of participant observations and interviews over a three-month period. The participant observations were conducted in places where the net-taxi/taxi was used for the entire passenger section, over distances (ranging from short to long). Interviews were conducted with internet taxi drivers, taxis and passengers.

2. The Discourse Arean Analysis Framework and the Lineage of Knowledge Production Theory

2.1. The field analysis framework and its related concepts in the field of STS

Field analysis is a sociological research method that aims to reveal the influence of power structures, knowledge structures and related cultural factors in a particular field. It uses qualitative research methods to understand and explain phenomena in a given field through an

in-depth analysis of the interrelationships between different subfields, communities and individuals within that field. Compared to other methods of social analysis, arean analysis focuses more on the impact of discursive decisions and representations, which gives it a higher level of analytical precision and theoretical granularity and can help to better understand the complex processes of power focus, mutual intentions and knowledge generation and transformation in social practices. (Van Loon, 2006; Bourdieu, 1993; Lamont & Molnár, 2002). Since the 1980s, arean analysis has been widely used in science and society because of its strong explanatory power for controversial scientific topics, such as the use of abortion pills and environmental protection (Clarke & Montini, 1993; Christensen & Casper, 2000). Discursive arean analysis in the field of sociology of science is an approach that examines the processes of scientific knowledge production and dissemination by analysing the language, symbols and practices of the scientific community to explore the inner structures, power relations and social meanings of science. The social nature of knowledge production is an important part of its study in the field of sociology of science. ---- draws on the explanatory power of arean analysis for complex social phenomena to investigate how the scientific community produces and authenticates knowledge, and the social factors underlying this. For example, Knorr-Cetina (1981), through his observations of high-energy physics laboratories, found that scientists are not just seeking objective truth, they are also constructing a social network through which knowledge is produced and authenticated.

In its development, the theory of arean analysis draws on traditions that trace back to the Chicago School and symbolic interactionism. The Chicago School's social ecological thinking emphasised the influence of the environment and social structures on individual behaviour and social phenomena. The school was represented by figures such as Thomas and Park, who argued that the behaviour of an individual or a social group depended on the environment and social structure, and that these factors interacted with each other. In contrast, representatives of the symbolic interactionist tradition, such as Mead and Blumer, focused on the processes of human interaction and meaning-making (Mead, 1934; Blumer, 1969)

Strauss developed the 'social world theory', which argues that each person is situated in a particular social world in which they communicate through language and other symbolic systems, and in which they establish a common understanding of each other. Thus, people's understanding of anything is based on the shared experience and knowledge of the social world in which they live. Strauss also emphasises the notion of the 'circularity of understanding', i.e. that people's understanding is not a one-way process, but one of constant return and renewal. People's new experiences and knowledge influence their previous understandings and lead them to re-examine their own ways of understanding, thereby increasing their level of understanding. Symbolic interactionism is playing an increasingly important role in the study of STS as symbolic interactionists become more widely involved in the study of STS. Clarke integrates Strauss's "social world theory" into the framework of arean analysis, stating that "when multiple social worlds have been and are intersected, the conflict of different causes, perspectives, and resources constitutes the arean." (Clarke & Star, 2008:113)

Typically, the arean analysis framework for the study of STS also draws on a range of scenario-based concepts, such as boundary object theory. Boundary object theory suggests that there are different types of 'boundaries' in social systems, which can be physical, psychological, cultural or institutional, and so on. Through these boundaries people communicate and interact with the outside world, and within these boundaries different groups and subsystems are formed. The concept of boundaries allows for the study of issues including scientific and technological controversies, the boundaries of knowledge production, etc. (Clarke & Star, 2003, 2008), and helps to examine how consensus is reached and how controversies are conducted in different social worlds. In conducting the analysis, it is important to explore different participants separately and examine how they engage in discursive reshaping through their

actions, thus forming different complex relationships with boundary objects (Jierying Zhang & Xueshi Li, 2019). In the following study traffic safety regulations are one such boundary object. This study attempts to monitor the interaction between the two types of knowledge by analysing the official discourse of the safety technology of online taxi operations and also focusing on the technical knowledge of private opponents in the process of its dissemination and implementation.

2.2. The production of legitimacy knowledge

In the field of sociology of science 'controversies' are of interest, in the context of a territorial analysis, where different social worlds construct their own discourses, their own knowledge, and take various actions to gain legitimating power over the relevant knowledge. And this process, that is, the process by which a specific scientific knowledge, by constructing its own legitimacy in the midst of scientific controversy, gradually becomes a fact that becomes recognised as science.

Merton first proposed the paradigm of scientific normativity, suggesting that science has to have certain goals, that scientists need to agree on norms of behaviour (e.g. public interest, etc.) at a collective or individual level for a common goal, and that internalisation and adherence to norms of behaviour by scientists is conducive to the betterment of the discipline. However, scholars of the sociology of scientific knowledge are generally critical of their norms; they do not deny the existence and role of the norms proposed by Merton, but rather argue that it is not social norms (moral norms) that guide scientists' behaviour, and that scientists' internal cohesion derives from a technical and cognitive norm. In their view, it is the cognitive criteria unique to scientific knowledge, such as logical coherence, observability, testability, precision, etc., that regulate the behaviour of scientists. (Barnes & Dolby, 1970; Mulkey, 1969)

Latour argues that the legitimacy of scientific knowledge is constructed through materialised features. By examining the history of science, he found that after the Pasteur experiment the laboratory gradually came into popular awareness as the ideal, authoritative site for the production of scientific knowledge. (Latour & Woolgar, 1979) Further, Shapin, Schaffer went on to examine the production of scientific knowledge in the laboratory and found that (1) the use of sophisticated and excellent instruments, and (2) the shared witnessing of witnesses, constituted key factors in the legitimacy of scientific positivism. (Shapin & Schaffer, 2011)

In addition to the scientific, legitimacy determination of knowledge, disputes over the production of knowledge often exist in the spatial transformation of knowledge, i.e. the space of legitimacy of knowledge is manipulated and designed so as to become a site of legitimacy, which is simultaneously visible and invisible, public and private, standardised and differentiated. The production of scientific sites on the one hand visualises invisible phenomena through the use of sophisticated instrumental data. However, on the other hand it hides some of these processes and behaviours, for example waste incineration plants usually do not show their chaos to the public (Zhang Jierying and Li Xueshi, 2019). Also, there is a subjective distinction when explaining knowledge to the public, with choices made about what can and cannot be told. Finally, standardised experiments appear to be universal, but in fact mask the significant impact that local variability can have on results (Henke & Gieryn, 2008).

Within the scientific discourse and approach, the idea of local individuation is often seen as narrow, one-sided and subjective. However, as scientific practice shifts from the 'laboratory ideal type' to the 'field ideal type', in which scientists increasingly need to interact with local people and produce legitimate knowledge by interacting with farmers in the farming space, common people knowledge plays an increasingly important role (Schwartz & Krohn, 2011).

This study hopes to examine how the two social worlds construct their own knowledge as an emerging field of technology in order to claim legitimacy in the discourse on the safety of the technical issue of safety in netiquitous vehicles from the perspective of knowledge production,

and it also hopes to explore the extent to which commoners' knowledge can have disciplinary validity by presenting the process of re-construction in the application of technological knowledge, and whether commoners can use similar knowledge to reflect to some extent on the legitimacy of scientific knowledge in the dominant official discursive form. The study also hopes to explore the extent to which common people's knowledge can have disciplinary validity, and whether common people can use similar knowledge to reflect to some extent on the legitimacy of scientific knowledge in the dominant official discursive form.

3. Traffic Safety Laws As A Boundary Object

The traffic safety law is a tool that has been extracted from millions of accidents to test the importance of safety on the road, and compliance with it represents a large part of the safety of the journey.

"I'm scared to look at a young driver like this who has only driven 1,000 or so orders... He dares to stop right at the zebra crossing" (Passenger 1,2023)

One of the core problems with the safety of online taxis is that passengers have no way of knowing how well the driver is driving or what his current driving conditions are. The above quote is from a passenger who took a car to a remote area where the journey was long and started and ended in the suburbs, where many of the roads were in poor condition and there were many large goods vehicles, and where the young driver acted impetuously and was disturbed by the stopping at zebra crossings. She believes that on such roads with more complicated conditions, it is a dangerous thing to take a ride if you are matched with an inexperienced novice driver.

"The platform will alert you when a driver is speeding, once or twice it's not a big deal, but old speeding then the platform will definitely deduct your safety points." (Driver 4, 2023)

"It will check two licenses, the driving licence and the vehicle age license, and it will check if the person's license is one... If you're caught it will deduct money." (Driver 6, 2023)

These two passages are from two online drivers who objectively describe how the platform screened for qualified and experienced drivers to ensure the safety of driving. The two safeguards are: one, by setting a threshold of certain scores to exclude drivers with low overall scores (including safety scores) --- system will, through an algorithm, give priority to drivers with high scores in dispatching orders, and more quality orders. Secondly, the platform will require the registration of online drivers by two certificates, including the driver's license and car operating license, and will also verify whether the person and car are united, without the phenomenon of topping. These two introductory paragraphs are an introduction to the platform's safety technology and are typical of the technical narrative.

According to data released by the World Health Organisation, the total amount of property damage and casualties caused by road traffic accidents in China is US\$390 billion per year, which has become a major problem that cannot be ignored for a fast-growing economic power. Meanwhile, according to data released by the Traffic Management Bureau of the Ministry of Public Security in 2020, there were a total of 208,000 road traffic accidents nationwide, resulting in 18,000 deaths and 127,000 injuries. Among them, traffic accidents caused by speeding and other traffic violations are still the main cause of accidents. As an important new industry in the country's transportation industry, the safety of online vehicles is responsible for the lives and health of drivers and passengers, as well as the overall social security and stability of the country.

Although the platform has set up a mechanism of rewards and penalties based on safety laws in relation to driving safety. However, in actual driving, there are many areas that are still unclear, leaving room for controversy. It leaves room for different interpretations by many different groups. Opponents and concerned passengers question the ability of the safety audit mechanism to determine unsafe driver behaviour and the binding nature of the penalties,

arguing that under the platform's profit model, the motivation and likelihood of unsafe driver behaviour increases, as does the risk of ride-hailing. However, the platforms and their supporters have touted the platform's operating system as being effective enough to ensure the safety of online riders, and taxi drivers and some overly worried passengers have demonised the group of online riders. This paper is not about which side is right or wrong and which side's narrative is more truthful, but rather about how both sides establish their own legitimacy regarding the formation of safety and related technical knowledge. In this paper, the Road Traffic Safety Law of the People's Republic of China is seen as a boundary object and the related controversy as a process of 'mediation', where the implementation of safe driving measures stipulated in the Road Traffic Safety Law of the People's Republic of China spans multiple social worlds. The implementation of the safety measures provided for in the PRC Road Traffic Safety Law spans multiple worlds, and the controversies surrounding it and because of it will continue in disagreement and thus in continuous knowledge production.

4. One of the Social Worlds: "Standardised, Detailed and Comprehensive" Safety and Security Measures

The safety measures of the platform are the materialised entity of the technology application, and as a social world, it is here that the social construction of driving safety will unfold. The following research summarises the safety measures seen through the eyes of passengers during their rides on the Drip platform. The journey shows the space for safety measures on the one hand, and how the average passenger 'sees' and understands this safety technology on the other.

Firstly, before starting the journey, the driver kindly asks passengers to fasten their seat belts. "The platform asks drivers to remind passengers to fasten their seatbelts, and if they don't say so, they'll get points... There are recordings in the car that the platform can see" (Driver 8, 2023) According to the driver, the platform will require drivers to remind each passenger to wear a seatbelt and other safety measures, and if some drivers take a chance or forget to remind passengers in time, the platform will use algorithms and audit monitoring technology to act as an all-knowing "god" and deduct the driver's corresponding score. The driver will be penalised by the use of algorithms and auditing technology as an all-knowing "god".

In terms of route selection, the driver can only take the route chosen by the passenger at the time of delivery, which is generally the best route automatically recommended by the navigation system, but if the passenger has special needs for the route (e.g. taking a major road, taking a national highway, etc.) they can choose their own route to avoid safety risks such as complicated road conditions. If the journey has already started and complex road conditions are found on the way, passengers will still have the opportunity to re-route.

"You just can't do anything about the traffic, you want to change the route you can only do it on your side, the driver we can't change the route on the phone, only the passenger can choose on the phone." (Driver 11, 2023)

On the way, you can see that the driver's mobile phone is generally equipped with a bracket clip in the middle of the car fan port, etc. The driver's navigation is consistent with the passenger's navigation, and passengers can keep track of the road situation at all times. At the same time, the car is also equipped with a unified public security camera and video recording facilities, used to monitor the driver's bad words and actions, passengers will also be recorded on their mobile phones after ticking the consent for backup. At the same time when the vehicle has speeding and other behavior, the platform is equipped with navigation will be prompted, the current speed is too fast, in the driver driving for a long time, there will also be a corresponding sound and mandatory rest measures.

"You see that black one with two dots is the recording device... The black one is from the public security system and it is mandatory to have this to open a drip, there is another one from the drip platform itself, which is probably better, this is not mandatory, you can have it if you want" (Driver 2, 2023)

Throughout the trip, the platform is trying to create a sense of third-party presence through visual screens, audible alerts, and panoramic open-view surveillance by recording and video equipment, which urges the driver to drive safely while giving passengers a positive mental implication.

At the end of the trip, passengers can also rate the driver, either by highlighting a specific tag to rate the driver as good or bad, or by directly choosing "not to take the driver" to block the possibility of meeting the same driver again, which is directly related to the driver's overall score and affects the number and quality of orders assigned to the driver by the platform. The quality of the driver's orders.

"The company's main goal is to provide the best possible service to its customers. (driver12,2023)

In order to ensure the effectiveness of security measures, the Drip platform has also sent out "divine visitors" in many cities to pretend to be passengers to conduct fishing spot checks on the behavior of online taxi drivers. The company's main goal is to prevent drivers from taking orders on multiple platforms, thus circumventing the Drip platform's safety protection measures for calculating fatigue time, and also to prevent drivers from overbooking their orders and thus laying down safety hazards.

"The 'divine visit' officer will personally take a ride after calling a car on other platforms, he will observe whether the driver has other mobile phones receiving broadcasts from the Drip platform, listen to the orders, then record the license plate and confirm in the system whether it is a registered Drip driver. Once verified, all safety points will be deducted at once... A poor safety record can have a profound impact on the high level of future flow" (Operating Vehicle Alliance, 2020)

It can be seen that the Drip platform has detailed and thorough protection measures throughout the entire process of taking a taxi, and these measures seem to create an immediate presence, trying to let every passenger "witness" that their trip is safe, that the driver has passed the relevant audit and is qualified, and that their words and actions are bound and regulated. The driver has been vetted and qualified, and is bound by rules and regulations. The positive image of a "regulated, safe and meticulous" platform is often easily established in the perception of the passenger with the platform's strong propaganda. When passengers take a taxi with this perception, they naturally have a consistent perception and expectation of all drivers on the platform, and are more likely to choose to take a ride on a platform with the relevant safeguards. The User Confidence Study on the Safety of Online Rides (2019) found that over 70% of users agree that safety on drops has gotten better over the past year.

However, what the platform does not show is how binding the platform's audio and video recording function, which is at the core of safety, and the platform's unregulated beep function are for drivers, how much negative reviews affect drivers, in which cities the so-called "magic visit" spot checks are conducted, whether they are conducted regularly, and how extensive they are. And so on. What is presented to passengers is a platform's safety technology, but this safety technology is still a technical black box for passengers, as they have no way of knowing exactly how this technology is being used in the process and what the results are. As one driver who opposed the online taxi platform said.

"Internet taxi accidents happen all the time, and the platform will break news like this to you? It's not just treated as a normal car accident." (Taxi driver, 2023)

5. The Social World II: Debating The Risks of Safety Technology for Online Taxis

This summary attempts to show another social world of safety technology for online taxis: those who believe that safety technology for online taxis has a limited role versus those on the platform side who support the safety technology in question. In this debate, the proponents of safety technology are mainly, platforms and some drivers, while the opponents are mainly taxi drivers, some passengers, and some drivers.

"It [the online taxi] can drop anywhere, it can stop anywhere, it can drive anywhere. It's good that it hasn't rubbed you up and hit you yet, driving that fast. People tunnel speed limit 40-60, that well, are hit dislike, he does not understand ah, inside still drive 100 to mph." (Taxi driver, 2023) In the eyes of taxi drivers, online dating is synonymous with chaos and danger, with a large number of inexperienced drivers easily qualifying for the road and driving recklessly without restraint, posing a great potential risk to driving safety. How do opponents of the driving safety and security mechanisms touted by the Drip platform understand and represent them? The core controversies are analysed in the following paragraphs.

5.1. Barriers to entry for online drivers: Is the driver's experience and skills up to scratch?

A driver's level of experience and technology, as an internalised personal skill, is difficult to be measured and measured concretely. According to the provisions of the Traffic Safety Law of the People's Republic of China, the relevant industries, such as buses and taxis, often consider the completeness of the relevant qualification certificates, the number of violations and the record of major safety accidents as an important basis for reviewing the driver's qualifications.

In this regard, the platform gives the registered dropshipping driver audit mechanism: 1. upload the three certificates including ID card, driving license, vehicle driving license and other documents 2. require drivers with three years of driving experience and above, and obtain a C1 license or above to register. You will be notified three working days after submitting your application online. Some drivers believe that both the uploading of documents requiring the binding of the person and vehicle, and the review of the ID card and driving license age experience are conducive to ensuring that the driver is with a certain level of driving experience and skill. (Drip platform)

However, opponents point out that the recruitment of taxi drivers in the same transport sector is more regulated than that of online vehicles. In addition to submitting the appropriate certificates and requiring a minimum number of years of driving experience, taxi drivers must also ensure that they have not had a major traffic accident within three years of driving, submit the appropriate application for approval, and take a qualification test at the end of the approval process, and finally sign an employment contract with the taxi company and receive a road transport certificate at the time of picking up the vehicle at The taxi management agency receives the road transport certificate. (Jia Baohua, lawyer, 2022)

"All raw melons are road killers... As far as the safe traffic piece is concerned, does he [the online taxi driver] know the law, right, which one can drive, look at that violation, how many violations a year do you know?" (Taxi driver, 2023)

"In terms of overall quality, I do feel that taxis will be a little better than online taxis." (Net taxi driver 5, 2023)

In contrast, opponents pointed out that the drops platform in relation to the driver violation rate, the corresponding processes (including assessment, registration, signing contracts) and other aspects of standardization are to be improved. And its need to register and report the main body is a single platform, online audit, as a profit-making enterprises to audit the qualifications, facing a triple risk: 1. can only be through a random check to audit whether the

registered driver is a vehicle driving drivers, with a certain lag; 2. platform as a company rather than the relevant industry institutions, can give limited punishment, such as three certificates do not fit a will have a fine penalty. 3. institutions themselves "Both athletes and players" plus the reduction of the process, how to ensure the quality of audit? It is clear from the preferential treatment given to newly registered drivers (new drivers and skilled veteran drivers are given the same amount of orders) that the platform as a business is more concerned with profit than with safety.

5.2. Monitoring of the journey: can safety technology truly weed out dangerous drivers

Both social worlds have used different strategies to legitimise their knowledge in the process of arguing for the effectiveness of safety measures for online car journeys. And the strategies used are often different due to the differences in the subjects. The platforms rely on the strength of their own resources, focusing on data, probability theory and authority to demonstrate the reliability of their own security technology.

Between 2018 and 2019 there were a number of major safety incidents on the Drip online platform, which were questioned by multiple parties, while being ordered by the state to rectify the situation. As of 2019, the Drip platform went live with core safety equipment such as audio and video recording and safety scores. It also claimed to have invested more than RMB2 billion in safety-specific funding in 2019, and will continue to invest nearly RMB3 billion in safety-specific funding in 2020 to respond to society's demands for safety. According to the data released by Drip in 2020, the rate of traffic injuries and fatalities in online vehicles dropped by 35% in that year compared to the same period. (Beijing, 2020) Charts, data, order, are all a way of showing the economics of measurement technology. The tight results belonging to the laboratory where the calculations were performed are presented to the public, and the Drip platform uses the de-localisation strategy of the scientific production space to highlight the scientific and accurate nature of its own safety technology by releasing measured safety data.

"Thanks to a year of all in safety... Behind the progress visible to the naked eye, Drip as well as finding achievable paths in traffic safety to reduce its occurrence." (Cheng Wei, CEO of DDT and Director of the Safety Management Committee, 2020)

In addition, the platform strives to increase its publicness and visibility as well as its authority. The Drip platform has invited police in over 280 cities to conduct hundreds of traffic safety training sessions for the platform, joined forces with police to create safety education videos on different travel scenarios, and launched customised safety broadcasts for the police. At the same time, Drip also actively cooperated with local traffic police departments to carry out nearly 100 "One Helmet, One Belt" themed traffic safety activities, jointly issued safety travel vouchers with the police, and carried out traffic safety publicity in the form of joint police and enterprise car stickers and safety posters. The joint efforts with the police, who have the authority in terms of driving safety knowledge, have resulted in the joint provision of safety facilities for safety education, while at the same time creating a joint "testimonial" through extensive publicity. Scientifically, such joint witnessing with scientifically trained experts is often considered more legitimate in terms of the facts it generates. (Shapin & Schaffer, 2011)

On the other hand, opponents are actively producing human and material evidence. The taxi driver suggested that in the driver's group "we post (online taxi safety accidents) all day long It's safety system is so bad you know." (Driver 3, 2023) "It's this kind of driver (drivers who don't know traffic rules) that he actually has, and the number is not small." (Driver 5, 2023) and the passenger's own experience "You know, the driver stopped at the zebra crossing and let me off, I'm scared now when I see a young driver" (Passenger 1, 2023) This evidence is widely available among dissenting drivers and passengers. As well as the driver's introduction of

"Audio and video recordings are mostly used as a back-up and are generally only used as evidence for verification after a dispute... It is usually the platform that retrieves the footage, not the traffic police" (Driver 9, 2023)

The users of the data, the uses of the data, and specific indices such as accident rates are not promoted by the platform, which selectively presents knowledge. Instead, the opponents rely on their own knowledge of the common people to expose the hidden facts behind the platform's supposed expertise, linking the expertise to the knowledge of the common people. (Choy, 2011)

6. Knowledge Reproduction in the Areal of Safety Technology for Online Rides

The ability of the technical safety system to guarantee the quality of platform drivers and to constrain them to drive in a regulated manner is the root cause of the controversy over online taxis. Both parties in the dispute want to prove that the platform drivers are qualified and obey the traffic rules. This is why the question of how to present the abstract level of quality and safety of the driver pool is so critical. Both sides are stating their view that the production of witnesses creates a common witness and thus produces legitimate knowledge about the safety of online vehicles.

The platform's presentation of the safety of online taxis consists of two main aspects, one is to place the monitoring system in a space where it can be seen by both drivers and passengers, and the other is to create a sense of normative legitimacy through a strong promotion of the censorship mechanism. This display is presented with three strategies including: exhibitionism, performativity and data. Firstly, the presence of the camera and recording equipment, the route map and the mobile phone in the passenger's hand, which are visually present in the car, create a sense of surveillance in the presence of a third party, allowing the passenger to "see" the driver is being monitored and restrained. Secondly, the platform will send out voice alerts when drivers are about to drive fatigued or exceed the speed limit, giving passengers an auditory sense that the driver's driving data is being monitored and reminded by the algorithm at all times. Finally, the platform strongly promotes a kind of "divine visit" spot check and safety score algorithm system, from the perspective of probability and data, to create a sense that the sample can represent the whole. The combination of these measures allows passengers to see the monitoring equipment at work at all times and to "see" the status of the vehicle.

Representation is a common knowledge production technique in scientific discourse. By turning the invisible state of the driver and the vehicle into a visible and audible display, the Drip platform shows the passenger in every ride, and the platform's safety technology is thus constantly producing witnesses of "safe online vehicle control technology". The strategy of presentation is not only about "how to show" but also about "what to show and what to hide". The visualisation of safety technology can make passengers feel better about the current status of the vehicle and driver and more confident that the trip is safe under the safety system, even if they don't understand the real use and effect of the surveillance video and voice prompts, they will still feel that the safety of the trip is transparent and open. In fact, what the platform presents is only part of the complex technical knowledge, and there are many parts that passengers cannot see and understand, such as how the video surveillance is controlled, how the voice prompts work on the drivers themselves, and how influential and binding they are. These surveillance devices present a close monitoring of the drivers' movements, but there is no mention of the factual difficulties they actually face and the extent to which they are used, given the large number of orders and the complexity of the situation.

On the other hand, opponents are creating both human and physical evidence. Passengers have witnessed drivers rushing and ignoring platform speeding warnings, some online drivers including illegal parking and taking phone calls on the road, and other behaviours. Unlike other

areas of expertise, there are a large number of people who are trained in professional driving safety, as well as having professional safety knowledge. At the same time, some passengers who are not trained in safety knowledge often have an ear for and understanding of basic safety knowledge rules. So there is a general consensus among many ordinary passengers as to whether a journey is safe or not, and whether the driver's actions and words are potentially dangerous. In other words, there is a strong link between professional knowledge and the knowledge of ordinary people. Opponents identify gaps in platform security technology through everyday experience (and also expertise), not through logical flaws in the technology and algorithms themselves, but by questioning the security involved through a counterfactual approach. A challenge is posed to the system designed by professionals. The platform tries to show that the overall driver pool has a consistent quality from a data point of view, for example through sample checks. However, because knowledge of safety has at the same time become a form of common sense, opponents seek to legitimise their own testimonies by perceiving and applying common sense, and they equally recognise the validity of testimonies to challenge the professionals' monopoly on the interpretation of safety technology from the logic of science, particularly positivism.

7. Conclusion

This study focuses on the controversy of the technology and shows, through a domain analysis, how the relevant knowledge is reproduced in the use of the technology and its opponents' questioning that. In the course of the controversy, both sides construct their own versions of relevant knowledge about the safety of online car travel. The platforms and their supporters use strategies such as probability theory and professional management knowledge to hold the scientific discourse through "presentation". The opponents, on the other hand, draw on the universality and decentrality of the knowledge on car safety, actively create "testimonies", question the validity of the relevant technologies through a counter-evidence approach, and ultimately find gaps in the scientific discourse constructed by the platforms by means of different logical chains.

At a time of rapid development and explosion of information, the speed of scientific and technological development is exponentially superimposed, and the residence period of technology is becoming shorter and shorter. In his book *The Birth of the New Alienation*, Rosa expresses the same concern: when technology advances too quickly and it becomes increasingly difficult for ordinary people to keep up with the speed of technological and conceptual developments around them, how can people understand their surroundings? How do people make sense of their surroundings and whether they will be alienated by them? This is an important question for China as a post-modern society immediately after rapid modernisation.

The study attempts to provide a theoretical/methodological package for the study of technological controversies. This paper introduces a theoretical domain analysis into the exploration of security technologies and their controversies, thus opening up the black box of technology. At the same time, the problems posed by the current uneven acceleration of society (objective culture developing at a much faster rate than subjective culture learning) are analysed through the tool of theoretical domain analysis, which is used to analyse the respective work involved in the production and application of knowledge and to elucidate the practical discourses of the various actors involved. As a series of conceptual theories of scenario drawing, this approach includes the following advantages: firstly, it uses the theory of boundary objects as a link between different kinds of people's information transmission and connection in various contexts, and through the debate and interpretation of boundary objects, it is possible to clearly explain the process of contesting the practice and discursive power of all parties

involved. Secondly, it facilitates the analysis of complex social phenomena with multiple perspectives; thirdly, it dynamically analyses the changes in the power of discourse. Finally, it is hoped that the paper will be able to study the use of technologies that are closely related to everyday life through a domain analysis, so as to discover the possibility that ordinary people can use the knowledge they have accumulated through their general knowledge and experience to initially understand and judge new technological knowledge.

The study has many limitations. On the one hand, the expertise involved in the design of online safety technology, such as probability statistics and management, traffic safety law, etc., is not absolutely unknown to the general public and does not require complex professional instruments to measure. At the same time, the main content of the traffic safety law as a scientific expertise is also common knowledge, and its specific concepts and methods of determination are well known to the general public. This means that the threshold of awareness of the general public is considerably lower when it comes to safety techniques that are developed in line with specialist knowledge, i.e. in comparison to knowledge in specialist medical fields such as waste incineration and abortifacients. A lay person who is not a technical expert is more likely, to find that there are still risks behind the official discourse presented on safety technology in netiquette.

However, the author believes that since scientific knowledge is a process of understanding from the superficial to the deep, from the surface to the inside, the seemingly complex fields of medicine, chemistry and other sophisticated knowledge with high cognitive thresholds still have the ability to form reasonable judgments and questions about technology through perceptual understanding and rigorous logical analysis, thus breaking the monopoly of knowledge power and at the same time alleviating people's sense of alienation under the rapid development of technology. The next step is to explore the possibility of forming reasonable judgments from the knowledge of the common people in areas of research that involve more abstract knowledge, such as the abuse of drugs and the protection of the environment.

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