Study on Administrative Enforcement of Transport in County L from the Perspective of Data Governance—Analysis Based on 157 Administrative Penalty Decisions

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Abstract: The use of digital technology to promote government administrative law enforcement "fair, standardised and efficient" is not only a hot issue of interdisciplinary innovation research, but also the research results have good practical guidance value. The 157 decisions on administrative penalties made by the Transportation Comprehensive Administrative Law Enforcement Brigade of L District, Sichuan Province between 2021.01 and 2022.09 were analysed by using Excell Forms and Tableau Software as the basic materials, which revealed the problems of inconsistent application of laws, non-standardised law enforcement behaviours, unscientific setting of discretionary standards and irrational work arrangements in the process of the law enforcement agencies. It also puts forward suggestions to enhance the effectiveness of ex post facto supervision by strengthening data analysis and to enhance the effectiveness of law enforcement by strengthening the ability of data mining. Due to the small amount of data, the single analysis tool, and the lack of field research in the research process, there is a lack of intuitive experience of law enforcement scenarios, which may lead to flaws in some of the inferences. The research ideas and analysis methods can be extended to other law enforcement departments to improve the effectiveness of administrative law enforcement.

1. Introduction

Fair, standardised and efficient administrative enforcement is an important manifestation of modern government governance.

The Third Plenary Session of the 18th Central Committee of CPC proposed that "the overall goal of comprehensively deepening reform is to improve and develop the socialist system with Chinese characteristics, and to promote the modernisation of the country's governance system and governance capacity." [1] To promote the modernisation of the national governance system and governance capacity, the first is to "comprehensively promote the rule of law, promote the administration in accordance with the law, and effectively achieve strict, standardised, fair and civilised law enforcement". [2] However, in practice, there are often many problems, such as law

enforcement system design is not scientific, law enforcement procedures are not standardised, the use of discretionary power is unreasonable, etc. [3]. Especially when administrative law enforcement officers abuse discretionary power [4], it will seriously undermine the impartiality of government law enforcement, and even trigger and intensify the conflict between the government and the people.

At the same time, with the extensive use of digital technology, how to combine digital technology with government administration and law enforcement, and how to apply data thinking to the construction of a modernised national governance system has become a major issue of the current era. The Fourth Plenary Session of the 19th Central Committee of the CPC called for: "Establishing and improving the system and rules for administrative management using the Internet, big data, artificial intelligence and other technical means. Promote the construction of digital government and strengthen the orderly sharing of data." [5] This document clarifies the use of digital technology in the direction of modern administration.

Therefore, the research scope of this paper is to combine data governance thinking, digital technology and modern government governance to carry out interdisciplinary and cross-disciplinary innovative cross-study; the research idea is to use data governance thinking and data analysis tools to analyse historical administrative law enforcement data, to dig out and explore the problems and possible causes of administrative law enforcement hidden under the data characteristics, and to put forward optimisation suggestions and measures; The purpose of the study is twofold: firstly, to propose strategies to optimise the effectiveness of administrative law enforcement with regard to the problems existing in L districts in Sichuan Province; secondly, to introduce data governance thinking into the construction of a modern government governance system by means of this study, so as to provide a research paradigm and solution ideas for the optimisation of the effectiveness of administrative law enforcement in the era of the digital economy.

2. Data sources, data processing and analytical ideas.

2.1. Data sources, data description, basic processing and analytical tools.

Firstly, the original data in this paper is from Sichuan Public Data Open Network [6], the source department is the People's Government Office of L City and L District in Sichuan Province, the total number of data is 157, which is unconditionally open to the public.

The raw data style is shown in Fig. 1. As can be seen from the chart, the raw data is broken down into a total of nine items, namely serial number, party, licence plate number, axle type, address of the offence, cause of the offence, circumstances of the offence, amount of the penalty (RMB yuan), and case number.

xuhao	dangshiren	chepaihao	zhouxing	wfdd	anyou	wfqj	cfjey	anhao
1	Wu	Chuan	3	County Road XL01 line Susha Road 3km+800m	Pollution of road	slight	200	Lezhong Road Administration Penalty [2021] No. 3
2	Yuan	Chuan	3	County Road XL01 line Susha Road 4km+300m	Pollution of road	slight	200	Lezhong Road Administration Penalty [2021] No. 4
3	Luo	Chuan	3	County Road XL01 line Susha Road 4km+300m	Pollution of road	slight	200	Lezhong Road Administration Penalty [2021] No. 5
4	Xie	Chuan	3	County Road XL01 line Susha Road 4km+300m	Pollution of road	slight	200	Lezhong Road Administration Penalty [2021] No. 6
5	Zho	Chuan	6	County Road XL01 line Susha Road 4km+300m	Pollution of road	slight	200	Lezhong Road Administration Penalty [2021] No. 7
6	Zhu	Chuan	6	County Road XL01 line Susha Road 10km+900m	Pollution of road	slight	200	Lezhong Road Administration Penalty [2021] No. 8
7	Zer	Chuan	2	Country road Y003 Suyang road 7km+600m	Pollution of road	slight	200	Lezhong Road Administration Penalty [2021] No. 9
8	Luo	Chuan	6	County Road XL01 line Susha Road 3km+200m	Pollution of road	general	1000	Lezhong Road Administration Penalty [2021] No. 10
9	Lir	YuD6	4	County Road XL01 line Susha Road 3km+800m	Pollution of road	slight	200	Lezhong Road Administration Penalty [2021] No. 11

Figure 1: Raw data style (partial).

In order to ensure the authenticity and accuracy of the original data, the author through the L District People's Government of Sichuan Province, open government information network, in the "statutory active public content" category under the "mandatory penalty information" column,

according to the original data in the case number of the public 157 The administrative penalty data were compared one by one. After verification, the contents of the 157 data records were consistent with the contents of the administrative penalty decisions made public, and the data were true and reliable.

Secondly, data description. Comprehensive administrative transport law enforcement agencies are law enforcement departments responsible for road traffic and transport management in their jurisdictions, and they are subordinate to local transport departments or transport bureaus. The data in this paper are the data of the comprehensive administrative traffic and transport law enforcement brigade of Area L in Sichuan Province (before the institutional reform, it was called Area L Highway and Road Administration Brigade) during the period of 05 January 2021 to 03 September 2022, based on Article 69 of the Regulations on the Protection of Highway Safety, and the Sichuan Province (Highway and Road Administration)" (hereinafter referred to as the "Discretionary Implementation Standards") [7], and in accordance with Article 69 of the "Regulations on the Protection of Highway Safety" and the "Implementation Standards for Discretionary Traffic and Transportation Penalties" (hereinafter referred to as the "Discretionary Implementation Standards"), in the area of Area L of Sichuan Province (Management Jurisdiction), it carried out a prosecution against the offending party with the subject of the case as follows Aggregation of data on administrative penalties for "Pollution of Highways" in Area L (Management Jurisdiction) of Sichuan Province.

Thirdly, in order to facilitate the analysis, the author has dealt with the raw data in three ways: one, the treatment of sensitivity. This paper hides the names of the parties involved in the case; the second is the treatment of data categories. This paper excludes the penalty data that do not belong to the case of "road pollution"; and the third is the generalisation of the items to be analysed. This paper summarises the information to be analysed into the data items that can be used for analysis.

Licence plate number	Place of registration	Axle type	Type of road	Illegal road names	Class of offence	Amount of fine (RMB yuan)	Penalty procedure	Date of penalty	Working day of enforcement	Cause of the offence	Penalty standard (RMB yuan)	Rate of fine
ChuanL98603	City	3	National road	G348	slight	200	simple procedure	20220304	Friday	goods falling pollution	≤5000	4%
ChuanL79755	City	3	National road	G348	slight	200	simple procedure	20220427	Wednesday	goods falling pollution	≤5000	4%
ChuanL79885	City	3	National road	G348	slight	200	simple procedure	20220505	Thursday	wheel mud pollution	≤5000	4%
ChuanL95268	City	3	National road	G348	slight	200	simple procedure	20220505	Thursday	wheel mud pollution	≤5000	4%
ChuanLB8122	City	3	National road	G348	general	1000	general procedure	20220330	Wednesday	goods falling pollution	≤5000	20%
ChuanL91037	City	3	National road	G348	general	1000	general procedure	20220507	Saturday	goods falling pollution	≤5000	20%
ChuanL80717	City	3	National road	G348	general	1000	general procedure	20220526	Thursday	wheel mud pollution	≤5000	20%
ChuanL81398	City	3	National road	G348	general	1000	general procedure	20220701	Friday	goods falling pollution	≤5000	20%
ChuanLD6937	City	4	National road	G348	general	1000	general procedure	20210705	Monday	goods falling pollution	≤5000	20%
ChuanC29679	Provincial	6	National road	G348	more serious	2000	general procedure	20220415	Friday	goods falling pollution	≤5000	40%
ChuanLD1813	City	3	National road	G348	more serious	2000	general procedure	20220418	Monday	goods falling pollution	≤5000	40%

Figure 2: Sample of analysed data (partial).

The analytical data table is shown in Figure 2, which includes 13 items, namely, licence plate number, licence plate origin, axle type, road type, road offence, offence level, fine amount, penalty procedure, penalty date, working day of enforcement, cause of penalty, penalty standard (RMB yuan) and penalty rate. It should be noted that there are four administrative penalty decisions with the cause of action other than "pollution of highways", which do not belong to the research category of this paper and were excluded, retaining the valid data of 153 items.

Fourthly, to facilitate data analysis and presentation, two data analysis tools, Excell and Tableau software, were used in this paper.

2.2. Characteristics of the data base and lines of analysis.

2.2.1. Data base characteristics.

Understanding the underlying characteristics of the data is a prerequisite for in-depth data analysis. In this regard, this paper describes both qualitative and quantitative aspects.

The qualitative description consists mainly of two dimensions: the application of legal provisions and the formulation of the subject matter of the offence.

In terms of adaptation of legal provisions. "Pollution of highways" penalty case involves the legal provisions of the "Highway Law of the People's Republic of China" Article 46: No unit or individual shall set up stalls on the highway and within the scope of the highway land, piling up objects, dumping rubbish, setting up barriers, digging ditches to divert water, the use of highway ditches to discharge filth, or to carry out other damaging, polluting highway and activities affecting the smooth flow of the highway; Article 51: Anyone who violates the provisions of Article 46 of this Law, causes damage to or pollution of the road surface of a highway or affects the smooth flow of the highway, or violates the provisions of Article 51 of this Law by using the highway as a test track, shall be ordered by the competent department of transport to stop the illegal act, and may be sentenced to a fine of not more than RMB 5,000 yuan. Regulations on the Protection of Highway Safety (State Council Decree No. 593), Article 43: Vehicles shall be loaded in a standardised manner, and the load shall not be dragged touching the ground. Vehicle loads are easy to fall, spilled or dispersed, should be taken compartments closed and other effective protective measures before travelling on the highway; Article 69: Vehicle loads touching the ground dragging, falling, spilled or dispersed, resulting in damage to the highway pavement, pollution by the highway management agency ordered to make corrections, and impose a fine of RMB 5,000 yuan. As well as the enforcement guidelines stipulated in Item 28 of the "Implementation Standards for Administrative Penalty Discretion in Sichuan Province Transportation I (Highway Road Administration)" (as shown in Figure 3). Through comparison, it was found that there were 142 penalty decisions applying the legal provisions of "Article 69 of the Regulations on the Protection of Highway Safety"; there were 10 penalty decisions applying the legal provisions of "Article 77, Article 46, Article 51 of the Highway Law of the People's Republic of China "Another penalty decision applied "article 43 and article 69 of the Regulations on the Safe Protection of Highways".

28	Penalties for vehicle loads touching the ground dragging, falling, spilling or drifting, resulting in highway pavement damage, pollution	[Administrative Laws and Regulations] Article 69 of the Regulations on the Protection of Highway Safety: If a vehicle load touches the ground and drags, falls, spills or floats, causing damage to or contamination of highway surfaces, the highway authority shall order rectification and impose a fine of not more than 5,000 yuan.	Vehicle loads touching the ground dragged, falling, spilled or floating, causing damage to the road surface, pollution of the act	slight	Vehicle load touching the ground drag, falling, spilled or floating without causing harmful consequences, ordered to correct, can promptly stop the illegal act and restore the original condition	Impose a fine of 200 yuan (RMB)
				general	Vehicle load touching the ground drag, falling, spilling or floating caused by highway pavement or ancillary facilities damaged, polluted	Impose a fine of 1,000 yuan (RMB)
				more serious	Vehicle load touching the ground dragging, falling, spilled or scattered affecting the normal passage of vehicles and pedestrians, there are traffic safety hazards	Impose a fine of 2,000 yuan (RMB)
				especially serious	If, after being ordered to make corrections, he refuses to stop the illegal act and restore the original state of the highway	Impose a fine of 5,000 yuan (RMB)
					Causing loss of life and property and other serious consequences of endangering road traffic safety	

Figure 3: Provisions of item 28 of the Implementation Standards for Administrative Penalty Discretion in Sichuan Province (Highway and Road Politics).

From the point of view of the specific formulation of the subject matter of the penalty. Although the cause of punishment is "pollution of highways", there are differences in the specific ways of pollution. Generally speaking, it can be summarised into three categories, namely, oil pollution of roads, wheel mud pollution of roads, goods falling pollution of roads. The number of three types of pollution ratio is 1:12:140. In terms of goods falling off the polluted highway, it includes falling

stones, gravel, cinder, mud, slag and so on. This illustrates the main types of road pollutants in Area L of Sichuan Province, and provides working ideas for the next step of pollution remediation by law enforcement agencies.

In terms of quantitative description, it consists of the following four main dimensions.

As can be seen in Figure 4. From the illegal vehicle belongs to the point of view, the city vehicles (licence plate number for Chuan L) accounted for 82%, the provincial vehicles (licence plate number for Chuan) accounted for 12%, accounting for 5% of the vehicles from outside the province (licence plate number is not Chuan); from the type of road violations, 48% of the violations occurred on provincial roads, 40% of the violations occurred on county roads, 10% of the violations occurred on national roads, and another 2% of the violations occurred on the countryside; from the seriousness of the violation of law, "minor" accounted for 41%, "general" accounted for 34%, "more serious" accounted for 22%, "special" 22%. From the point of view of the severity of the situation, the illegal situation "slight" accounted for 41%, "general" accounted for 35%, "more serious" accounted for 21%, "especially serious" accounted for 3%. Serious" accounted for 3%; from the point of view of the amount of punishment, there are RMB 200 yuan, 500 yuan, 1,000 yuan, 2,000 yuan, 3,000 yuan and 5,000 yuan, of which the largest number of cases was punished RMB with 200 yuan, accounting for 41%; the second largest amount of punishment was RMB 1,000 yuan, accounting for 34%; the top penalty, i.e., the amount of fine amounted to RMB 5,000 yuan, accounted for 3%; there were three cases in which RMB 500 yuan was imposed respectively, accounting for 3%; and there were three cases in which RMB 500 yuan was imposed respectively. Three cases were fined RMB 500, 2,000 and 3,000 respectively. Whether the amount of the fine has been "comprehensively considered the facts, nature, circumstances and degree of social harm of the offence" [4] is a matter of concern.
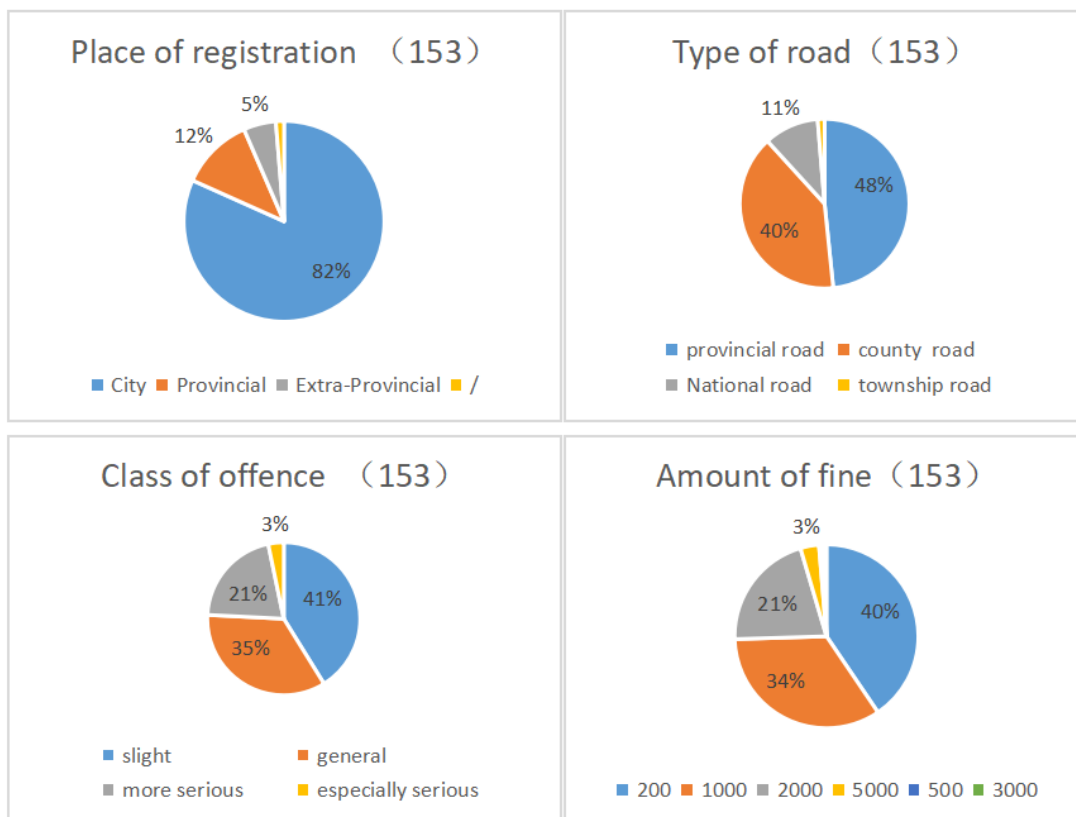

Figure 4: Map of data base characteristics (licence plate origin/road type/offence class/fine amount).

By summarising the characteristics of the data base in both qualitative and quantitative terms, it

is possible to visualise the characteristics of past enforcement, as well as shedding some light on the organisation of the ensuing enforcement work.

2.2.2. Ideas for analysing factors based on the amount of the penalty.

The primary purpose of this paper is to analyse and mine the historical law enforcement data of administrative law enforcement agencies, to discover the law enforcement laws hidden under the data features, to explore the possible law enforcement problems, and to put forward effective countermeasures and suggestions for the existing problems, so as to further optimise the effectiveness of administrative law enforcement and to promote and improve the construction of the modern national governance system. Based on this purpose, this paper requires that in the process of data analysis and mining, in addition to describing the characteristics of the basic data, it should also establish a logical and appropriate analysis strategy to help reveal the intrinsic laws of the data.

This paper argues that: i. Although there are more indicators that reflect the offence, the indicator that in the final analysis best reflects the degree of the offence is necessarily the amount of the penalty. In accordance with the principle of equivalence of penalties [8], it is generally believed that the higher the degree of violation, the higher the amount of the fine will be. Therefore, by analysing the amount of penalty is often more able to capture the key; secondly, the correlation analysis of other indicators with the amount of penalty is conducive to reflecting the relationship between factors, and is more effective in reflecting the problem. In view of this, this paper adopts a two-factor analysis to explore the relationship between enforcement workdays, vehicle axle types, road types, offending roads and the amount of penalties respectively, as well as to explore the relationship between enforcement workdays and road types.

In view of the research needs of this paper, under the two-factor analysis method basically achieved the purpose of the study, and therefore did not develop the three-factor, multi-factor relationship to explore, other scholars, if interested, can follow this analytical logic to do further research.

3. Two-factor exploratory analysis based on penalty amount.

After clarifying the ideas and strategies for data analysis, this paper analyses the data using the data analysis tool Tableau software and draws the following exploratory analysis conclusions.

3.1. Enforcement workday bias under different subgroups of penalty amounts.

Law enforcement workdays, generally Monday through Friday. However, there are also cases of holiday transfer to make up work. For example, Sunday, 13 February 2022, was a Spring Festival holiday transfer to make up work; Saturday, 07 May 2022, was a May Day Labour Day transfer to make up work. Therefore, the penalty records appeared on both days, which are enforcement workdays. In this paper, we firstly corresponded the enforcement record dates to working days, and then analysed the data according to the two factors of penalty amount and enforcement working days, and obtained the following figure 5. From the figure, we can see that: 1. In the RMB 200 subgroup, 37.10% of the penalty records were on Wednesdays, which had the highest number of records; and the number of penalty records on Tuesdays and Fridays was significantly lower than that of the other working days (excluding Saturdays and Sundays). 2. In the RMB 1,000 and RMB 2,000 subgroups, the number of penalty records is relatively balanced and does not show a significant difference.3. In the RMB 5,000 subgroup, the number of penalty records is also relatively balanced, although there are only five penalty records.4. In the RMB 500 and RMB 3,000 subgroups, the number of penalty records lacks analytical value due to the small number of penalty
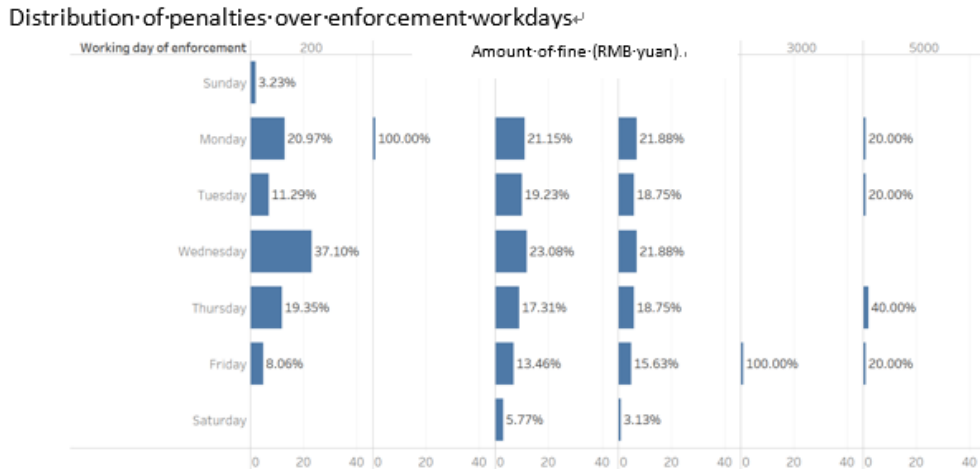
records, and is not taken into account.

Figure 5: Distribution of penalties over enforcement workdays.

This leads to the following exploratory thoughts: 1. Is the "Wednesday feature" prevalent in the RMB 200 grouping over time? If so, what are the possible reasons? For example, are there more offences on Wednesdays per se? Or is it that there is more staffing or more frequent enforcement on Wednesdays? Is it related to the rotation of enforcement officers? If so, what caused the larger number of enforcement records? In addition, the number of enforcement records in the sub-group of RMB 1,000 and above is more balanced, is there any reason for this? Is it because when the circumstances of the offence are relatively more serious, the enforcement officers maintain greater rigour in enforcement and thus make relatively more prudent decisions on penalties, thus showing a balanced characteristic? And so on.

3.2. "Tailoring"—the amount of penalties shows differences in the enforcement characteristics of different vehicle axle types.

It is generally accepted that the amount of the penalty is related to the consequences of the offence. The more serious the offence, the higher the penalty. The question is, is there a relationship between the amount of the penalty and the vehicle? For example, with vehicle axle type. To explore this issue, we construct a two-factor relationship between vehicle axle type and penalty amount, as shown in Fig. 6. Focusing on the analysis of penalty subgroups with penalty amounts of RMB 200, RMB 1,000 and RMB 2,000. It can be seen that: 1, in the RMB 200 grouping, the number of penalty records for 3-axle vehicles is significantly higher than that for other axle types; 2, in the RMB 1000 grouping, it is concentrated on 3-axle, 4-axle, and 6-axle vehicles, and the number of penalty records shows a decreasing trend; 3, in the RMB 2000 grouping, it is mainly concentrated on 3-axle and 4-axle vehicles, and the number of penalty records shows an upward trend; 4, In the RMB 5000 grouping, although the data is less, it can be seen that there are top penalties on 2-axle and 3-axle vehicles; 5. From the comparison of the horizontal graphs, it is different. 200 RMB grouping has a high 3-axle, 1000 RMB grouping has a counter-axis decline, 2000 RMB grouping has a pro-axis rise, and 5000 RMB grouping has a balanced characteristic.

Based on the above characteristics, the following assumptions are made: 1) 3-axle vehicles have the highest number of fines in general, which may be due to the fact that 3-axle vehicles are the dominant type of vehicles engaged in cargo transportation in Area L; 2) there may be a relationship between the type of axle of the vehicle and the circumstances of the offence; 4-axle vehicles have 34 records of penalties exceeding RMB 1,000 (≥1,000), which is significantly higher than the 4 records of penalties in the RMB 200 grouping; 3) the lower limit of RMB 200 set in the

Discretionary Implementation Standards may be the reason for the higher number of penalties in the RMB 200 grouping and may mask the severity of the circumstances of the offence. 3. The lower limit of RMB 200 penalties set out in the Discretionary Implementation Standards may have contributed to the higher number of records of penalties in the RMB 200 subgroup and may have masked the severity of the factual circumstances of the offence. The expansion of the benchmark tier setting for discretionary power in accordance with the facts of the offence and the purpose of the penalty deserves further study by the relevant authorities.

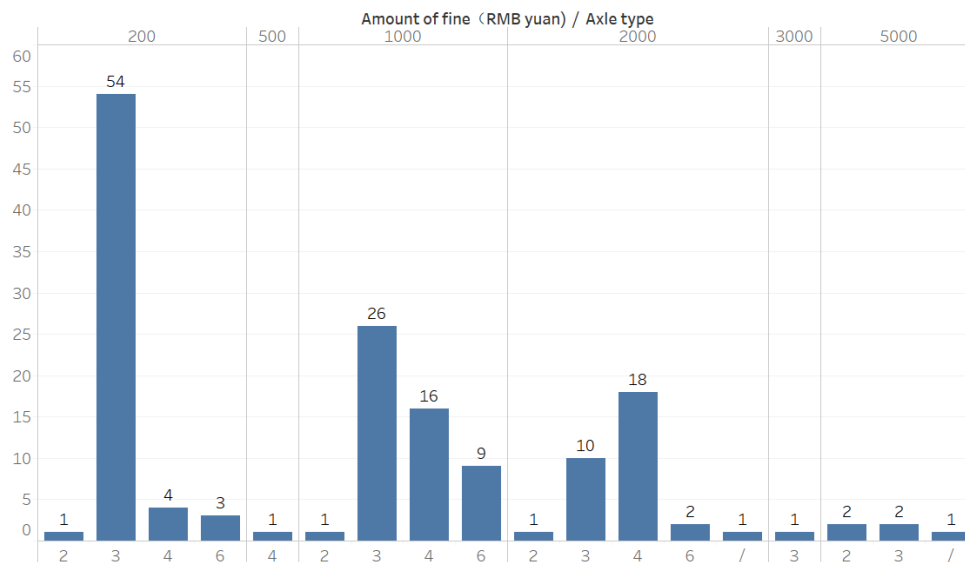Distribution of penalties by vehicle axle type

Figure 6: Distribution of penalties by vehicle axle type.

3.3. Preference of law enforcement agencies for provincial and county roads.

Roads in China are usually divided into four levels, namely national roads, provincial roads, county roads and township roads. Usually, the higher the road level, the higher the construction standard, and the greater the damage consequences caused by the offence may be. Therefore, it is equally interesting to explore the relationship between road type and penalty amount. Whether there is a significant relationship between the penalty amount and the road type is shown in Figure 7 below.From the figure, it can be seen that: 1. On provincial roads, the number of penalty records in the group of RMB 200 has the highest number of 41 records, and at the same time, the number of penalty records on provincial roads has reached more than 50% of the total number of penalty records (153), which is likewise the highest number of records; 2. There are a total of 59 records of penalties on county roads, of which 28 records of penalties of RMB 1,000, accounting for about 48% of the total; at the same time, there are also four records of RMB 5,000 top-up penalties on county roads; 3. The number of records of penalties on national highways is relatively small and shows a balanced performance in the grouping of each penalty amount.

Accordingly, the following speculations can be made: (1) One of the reasons for the low number of penalty records on national and rural roads may be that the number of violations of the law itself is low, and the other may be that violations of the law have occurred but have not been investigated and dealt with. Considering the need for high-speed traffic safety on national highways and the cost of law enforcement on rural roads, it can be assumed that law enforcement agencies have allocated less law enforcement power on national highways and rural roads, and it is understandable to focus on the allocation of limited resources, but at the same time, the problem should not be ignored, and

it is worthwhile to discuss whether it is possible to make up for this in other ways in the future; (2) The number of records of offences grouped under the penalty of RMB 200 on provincial highways is higher than the number of records of offences grouped under the penalty of RMB 1,000 or more on county highways. The number of offence records in the group of RMB 200 on provincial roads is higher, while the number of offence records in the group of RMB 1,000 and above on county roads is higher, does this phenomenon imply deep-rooted reasons? It is difficult to judge with the limited amount of data, but it is still worth paying attention to.
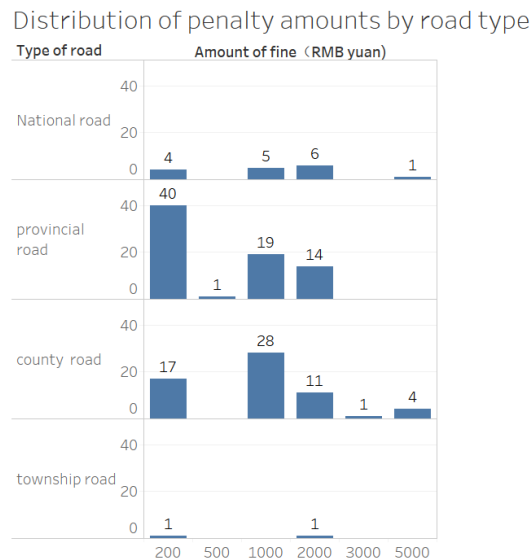

Figure 7: Distribution of Penalty Amounts by Road Type.

3.4. "Pollution of roads" offences are evident on provincial road S103 and county road XL01.

Further analysis of which roads the violations occurred on revealed the following characteristics under different penalty amount groupings: (1) In the RMB 200 grouping, there were 12 penalty records for each of County Roads S104 and S306, and 11 for County Road S308, with a combined total of 35 violations for the three roads, accounting for 56% of the weight of the grouping. In addition, County Road XL01 has 8 records of violations, which is the main illegal occurrence road of the county road; (2) In the RMB 1,000 and RMB 2,000 subgroups, it shows both completely different characteristics from the RMB 200 subgroup and basic convergence within the group. For comparison, in the RMB 1,000 subgroup, the main offence records occur on National Highway G348, Provincial Highway S103, and County Road XL01; in the RMB 2,000 subgroup, its main offence records occur on National Highway G348 and Provincial Highway S103, and the two subgroups are similar in graphic characteristics; on the contrary, when comparing the two groups with the RMB 200 subgroup, it is found to be a completely different road. For example, roads such as S104 and S306, which have a high number of offence records in the RMB 200 grouping, correspond to very few offence records in the RMB 1,000 grouping, and there are no offence records on these two roads in the RMB 2,000 grouping; (3) The rest of the penalty amount groupings do not have obvious characteristics due to the small amount of data.

Based on the characteristics identified in the above analysis, it can be summarised that the cases on roads S104, S306 and S308 are mainly "minor" cases, whereas the cases on roads G348, S103 and XL01 are mainly "general" cases and above. However, such a conclusion is open to reasonable doubt. Generally speaking, offences on the same road should be of varying severity. However, from the graphical characteristics shown in Figure 8, there are roads with "minor" and "serious" offences,

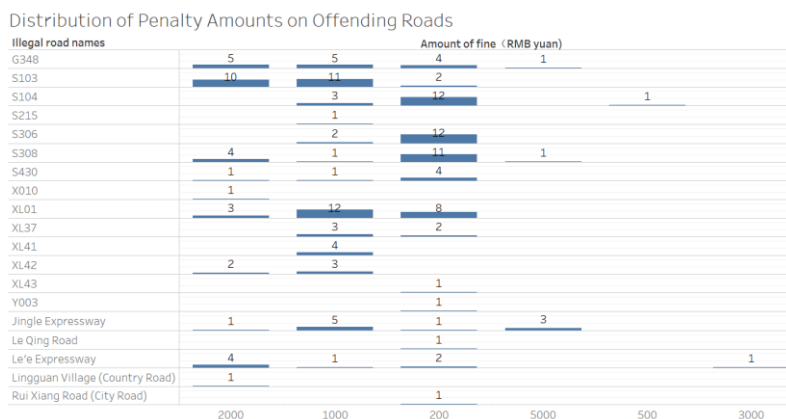which is obviously not in line with common sense, and the underlying reasons are worth exploring in depth.

Distribution of Penalty Amounts on Offending Roads

Illegal road names	2000	1000	200	5000	500	3000
G348	5	5	4	1		
S103	10	11	2			
S104		3	12		1	
S215		1				
S306		2	12			
S308	4	1	11	1		
S430	1	1	4			
X010	1					
XL01	3	12	8			
XL37		3	2			
XL41		4				
XL42	2	3				
XL43			1			
Y003			1			
Jingle Expressway	1	5	1	3		
Le Qing Road			1			
Le'e Expressway	4	1	2			1
Lingguan Village (Country Road)	1					
Rui Xiang Road (City Road)			1			

Amount of fine（RMB yuan）

Figure 8: Distribution of Penalty Amounts on Offending Roads.

3.5. Enforcement time patterns reflected by law enforcement officers on different roads.

Figure 8 shows the distribution of offences on specific roads, while Figure 9 reflects the number of offences on a planar coordinate graph constructed from the two factors of time and road. It should be noted that Figure 9 adopts a "line" graphical presentation, in the graphical visual effect to show a continuous record of violations, but this does not mean that every working day there is a record of violations, but only in a certain time scale within the scope of the continuous graphical characteristics. The main use of this graph is to illustrate the law enforcement agencies in the law enforcement time pattern. As can be seen from the figure: (1) National Highway G348, Provincial Highway S306, and Jingle Expressway, Le'e Expressway, the illegal record is more continuous; (2) some of the roads illegal record line is shorter, such as Provincial Highway S103, the illegal record from December 08, 2021, stops on July 05, 2022; County Road XL01, the illegal record started on January 05, 2021, stops on 11/10/2021. In addition, provincial road S104, S308, S430, county road XL37 and other illegal records for a shorter period of time; (3) in the graphics also appear dotted illustrations, such as provincial road S215, county road X010, XL02, XL43, and rural road Y003 and other roads, dotted illustrations mean that it is only a single offence record in the statistical cycle.

In summary, some road offences were recorded more continuously, some road offences were recorded for a shorter period of time, and some road offences were recorded only once. The reason for the large differences in the duration of road offence records within Area L can be surmised as follows: law enforcement agencies may have adopted different law enforcement strategies on different roads; on some roads, long-term fixed-point law enforcement inspections are carried out, such as the S306 and the Jingle Expressway; on some roads, phased and focused inspections may have been carried out, such as the S103 and the XL42; and on other roads, random inspections, e.g. roads such as S215, XL02. It is possible that different enforcement strategies and hence different enforcement behavioural characteristics may have emerged. Accordingly, we can also speculate the distribution profile of the enforcement force of the integrated transport enforcement brigade in Area L, so as to optimise the enforcement work arrangement afterwards.
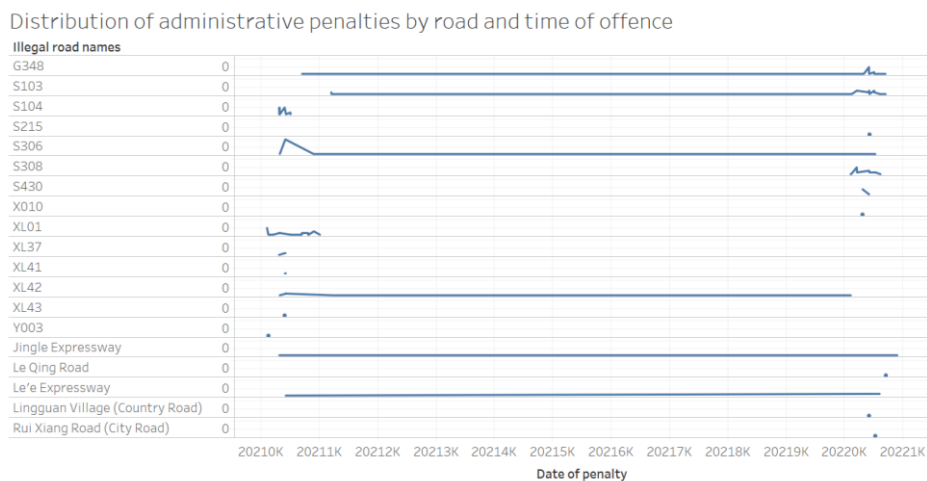
Figure 9: Distribution of administrative penalties by type of road and time of day.

It should be highlighted that the exploratory analyses of the above five aspects are the result of an exploration of possibilities based on the data characteristics derived from a single analytical tool and methodology with a limited amount of data, and the conclusions are not reliable enough to be surmised. The purpose of the exploration in this paper is to illustrate how exploratory research can be carried out using data analysis tools based on a digital governance perspective, and to provide a research paradigm. Therefore, the above speculative conclusions are for reference only.

4. Recommendations for using data to explore findings to optimise the effectiveness of administrative enforcement.

Through the analysis of 157 administrative penalty data of the comprehensive administrative transport enforcement brigade in Area L of Sichuan Province, the discovery of enforcement characteristics and the revelation of problems of law enforcement agencies are basically achieved, which provides a working direction for the next step of optimising the comprehensive administrative transport enforcement agencies in Area L to improve the effectiveness of law enforcement. This paper puts forward the following two optimisation suggestions:

4.1. Enhanced data analysis to increase the effectiveness of ex post facto monitoring under a digital governance perspective.

There are two kinds of data: static and dynamic. Static data are easy to fake, while dynamic data, especially continuous dynamic data reflect the internal characteristics of not only difficult to fake, but also a true reflection of the inner laws of things. Because of this, through the analysis of dynamic data and mining has become an important means of post-supervision. The effectiveness of specific supervision is shown in the following three aspects:

(1) Supervision of law enforcement personnel to regulate law enforcement. Standardised law enforcement is the primary requirement of administration in accordance with the law, and is also an important basis for assessing law enforcement personnel. In this paper, after analysing the data of 153 penalties, we found two problems of irregular law enforcement. First, inconsistencies in the legal application provisions in the administrative penalty decision letter; second, failure to strictly implement the provisions of the Administrative Penalty Law on "aggravation of penalties for repeated offences". For example, the offending party, Luo Mou, driving a vehicle with licence plate number Chuan L87151, was fined 200 RMB on 05 January 2021 for "polluting a highway" under

"minor circumstances", and then fined 200 RMB for "minor circumstances" on 19 April of the same year under the same circumstances, and then fined 200 RMB for "minor circumstances". On 19 April of the same year, a fine of RMB 200 was imposed for the same offence under "minor circumstances". Obviously, in the same year, the offending party was not given a heavier penalty for the same offence on the second occasion, which indicates that there may have been an enforcement error by the enforcement officers in the course of enforcement. In addition to this, the data analysis can also be used to test the enforcement level of law enforcement officers. Since the information of law enforcement officers is not provided in the original data of this paper, the author is unable to do further research. If the information of law enforcement officers is complete, the law enforcement behaviour of law enforcement officers can be further analysed. By comparing the law enforcement data horizontally and vertically, it is possible to find out which law enforcement officers' law enforcement data are abnormal? Which enforcement officers' enforcement data are not stable enough? And so on. Therefore, strengthening data analysis is conducive to the supervision of law enforcement personnel's standard law enforcement.

(2) We need to supervise the proper arrangement of law enforcement work. The arrangement of law enforcement work involves the reasonable deployment of resources, such as people and property, and has a bearing on the punishment and combating of offences within the jurisdiction, as well as the protection of the orderly and healthy development of the local transport industry. Therefore, strengthening ex post facto enforcement monitoring will be conducive to testing the reasonableness of the enforcement arrangements. First, on the premise of limited enforcement resources, how to reasonably allocate enforcement resources to carry out enforcement on key road sections. For example, during the period from 05/01/2020 to 03/09/2021, the highest number of penalty records was recorded on Provincial Highway S306, which indicates more violations. However, in terms of the penalty amount, the number of penalty records with a penalty amount of more than RMB 200 (excluding RMB 200) was only two, thus indicating that although there were more offences on Provincial Road S306 and more enforcement resources were allocated, the overall offence was less serious; on the contrary, the number of penalty records with a penalty amount of more than RMB 1,000 (including RMB 1,000) on Provincial Road S103 was as many as 21 times. The number of penalties of less than RMB 1,000 is only 2, which indicates that the offences on Provincial Road S103 are more serious and may have more serious safety consequences. In view of this, law enforcement agencies should focus on investing more law enforcement efforts in areas and road sections with relatively more serious offences, and increase their enforcement efforts in order to crack down on offences and eliminate road safety hazards to the fullest extent possible.

(3) We need to supervise whether the discretion is fair and reasonable. Discretionary benchmarks were originally set to facilitate law enforcement officers to carry out law enforcement work and regulate law enforcement behaviour. However, the reasonableness or otherwise of the discretionary standard itself has become the key to the fairness and reasonableness of administrative enforcement. The analysis of enforcement data after the fact will be conducive to seeing the degree of reasonableness of the setting of discretionary standards. Item 28 of the Discretionary Enforcement Standards sets four levels of discretionary standards for the case of "pollution of highways". Through data analysis, it was found that of the 153 administrative penalties for "pollution of highways", 151 were imposed in accordance with the line of discretionary standards. The other two cases, case numbers <Lezhong Road Administration Penalty [2021] No.18> and <Lezhong Traffic Enforcement Penalty [2021]No. 82>, were fined 500 RMB and 3,000 RMB respectively. This shows that the law enforcement officers carried out the law enforcement in full accordance with the discretionary benchmark in the law enforcement process; secondly, among the 153 administrative penalties, 12 administrative penalties were explicitly stated in the decision letter as the cause of the pollution as "polluting the highway with mud from the wheels" (see Table 1).

Table 1: Cases of "mud on wheels" pollution of roads.

Case number	Class of offence	Amount of fine (RMB yuan)	Cause of the offence
Chuan 1101 Traffic Penalty [2022] No. 0100	general	1000	Lorry wheels pollute roads with mud
Lezhong Road Administration Penalty [2021] No. 16	general	1000	Lorry tyres pollute roads with mud
Chuan 1101 Jiajian Penalty [2022] No. 0023	slight	200	Lorry wheels pollute roads with mud
Chuan 1101 Jiajian Penalty [2022] No. 0024	slight	200	Lorry wheels pollute roads with mud
Chuan 1101 Jiajian Penalty [2022] No. 0001	slight	200	Lorry wheels pollute roads with mud
Chuan 1101 Jiajian Penalty [2022] No. 0025	slight	200	Lorry wheels pollute roads with mud
Chuan 1101 Traffic Penalty [2022] No. 0032	more serious	2000	Lorry tyres with mud on the road polluting the highway
Chuan 1101 Traffic Penalty [2022]0028	more serious	2000	Lorry tyres with mud on the road polluting the highway
Chuan 1101 Traffic Penalty [2022] No. 0001	especially serious	5000	Mini-excavator pollutes roads with mud from tyres
Chuan 1101 Traffic Penalty [2021] No. 0027	especially serious	5000	Lorry tyres pollute roads with mud
Chuan 1101 Traffic Penalty [2021] No. 0008	especially serious	5000	Minivan pollutes road with mud from tyres
Chuan 1101 Traffic Penalty [2021] No. 0009	especially serious	5000	Loader tyres pollute roads with mud

As can be seen from the table, the circumstances of the offence of "mud on wheels" cover four levels, with penalties ranging from a minimum of RMB 200 yuan to a maximum of RMB 5,000 yuan. From a common sense point of view, the offence of "wheel with mud" is not high. It is questionable whether the maximum penalty of 5,000 RMB is reasonable. Suggested that the relevant departments for the "wheels with mud" pollution causes again to carry out investigations and studies, based on facts, upholding the principle of fair and reasonable amendments to the discretionary benchmarks. For example, whether it is possible to abolish the "wheels with mud" of administrative penalties, whether it is possible to further expand the level of discretionary benchmarks? In short, through the adjustment of discretionary benchmarks, can better achieve administrative law enforcement fair and reasonable, so that the offending party convinced.

4.2. Enhancing data mining for law enforcement capacity in the context of digital governance.

In the context of the new era, how to combine the digital economy with the construction of modern government governance and with the standardisation of administrative law enforcement has become a major issue in the current society. This paper argues that strengthening data mining to enhance law enforcement capacity should focus on the following three aspects.

We need to cultivate the concept of data governance values. To carry out data mining, the first thing is to establish a scientific and correct data governance value concept. First, correct the wrong understanding. Currently, many scholars and government officials believe that the government sector is only a data production department, which is obviously wrong. Government departments are not only data production departments, but also data use departments. Scientific decision-making, the first is data. Without data support, the reliability of decision-making is difficult to be guaranteed. Second, to correct the inherent concept. Some people believe that the business sector to carry out data mining, the purpose is to find business opportunities and seek economic benefits. Government

departments, on the other hand, do not need to and cannot pursue economic benefits, and therefore do not need to carry out data mining. This inherent concept is obviously outdated. Data mining in government departments can identify problems and explore patterns, thereby improving management effectiveness. The realisation of management effectiveness is manifested in the combination of social and economic benefits. Therefore, data mining can only be truly effective if the value of data governance is first recognised.

We need to establish a mechanism for analysing standing data. With the guidance of the concept, the next need for mechanisms to protect. Standing data analysis mechanism is an important guarantee to achieve data mining. According to different ways of division, you can establish a systematic data analysis mechanism. For example, according to the time dimension, a regular analysis mechanism can be formulated for different time periods, such as monthly, quarterly, semi-annual, annual, etc.; according to the division of the analysis subject dimension, an internal analysis mechanism and an external analysis mechanism can be established. Especially when administrative law enforcement departments do not have internal data analysis capabilities, they can cooperate with external professional data analysis agencies to carry out data mining; they can also be divided according to the dimension of the analysis objectives, establishing an analysis mechanism targeting at discovering anomalous problems, an analysis mechanism targeting at testing the level of law enforcement, and an analysis mechanism targeting at exploring the laws of the data and then adjusting the policies and improving the effectiveness of law enforcement. Therefore, a regular data analysis mechanism will become a "Damascus sword" for law enforcement supervision, guarding the fairness and norms of administrative law enforcement.

We need to form a data analysis talent team. To achieve effective data mining, the key is still in the people, especially professional data analysis talent. At present, the wave of digital economic development is sweeping society, around the data generation - data mining - data use of the digital economy development paradigm is evolving. However, from an objective point of view, against the background of the continuous generation of a large amount of data, the data mining capacity and level are still insufficient. Therefore, in order to achieve data mining in administrative law enforcement departments, it is necessary to establish a data analysis talent team. First, the selection of data analysis talents. In the past five years, some domestic colleges and universities have opened data talent professional external enrollment, the first batch of data analysis talents have entered the talent market, which provides a possibility for the selection of data talents; the second is to cultivate data analysis talents. Excellent data analysis talents must understand the business. Because only those who understand business and processes can truly understand the laws reflected behind the data. Therefore, the selection of data analysis talents must have business skills, which is the key; Third, the use of data analysis talents. The work of data analysis talents is to use data analysis skills to discover law enforcement problems and explore the laws of data in order to correct law enforcement errors and adjust law enforcement strategies. Therefore, the data analysis conclusions made by the data analysis talents should be used and dared to be used in order to truly test the value of their data analysis.

This paper argues that, from the perspective of digital governance, combining the digital economy and administrative law enforcement, using data analysis and mining capabilities, firstly, it can be used as an important tool for administrative law enforcement aftermath supervision, testing administrative law enforcement work, and ensuring the fairness and standardisation of administrative law enforcement; and secondly, digital governance thinking is introduced into the process of administrative management by establishing correct data values, establishing a regular data analysis mechanism, and setting up a team of professional data analysts, so as to truly realise the goal of modernised governmental governance.

5. Summary.

At present, how to apply digital governance technology to the process of social governance, to promote and facilitate the overall improvement of the effectiveness of administrative law enforcement, to achieve the modernisation of government governance, and to better achieve the goal of "people's satisfaction with the government" in the new era of governance, has become a hot issue that needs to be urgently solved by all segments of the society. The highlight of this paper is that it provides a research paradigm and ideas for other scholars to carry out the cross-cutting issues of data governance combined with administrative law enforcement and social governance. Of course, the shortcomings of this paper are threefold: first, the amount of data is relatively small, and only a single type of "polluted highway" penalty data, and there may also be data incompleteness, which will lead to the analysis of the data characteristics and exploration of the conclusions of the possible bias or error; second, this paper only uses two basic data analysis tools, and only constructs a two-factor analysis. The second is that this paper only uses two basic data analysis tools and only constructs a two-factor analysis, which may not be sufficient to reflect the full picture of the data relationship, leading to insufficient depth in the explored conclusions; the third is that in the process of carrying out the study, the author mainly uses methods such as literature research, logical inference and inductive deduction, but does not carry out field research, and lacks intuitive feeling of actual law enforcement scenarios, which may lead to the existence of flaws or loopholes in some of the inferences. The impact of the above three reasons may be the incomplete presentation of data features, inaccurate discovery of problems, and flaws in exploratory thinking. However, on the whole, these do not affect the general framework and research ideas of this paper's study, and do not materially affect the realisation of the research logic of introducing digital governance thinking into the field of administration and social public governance, and do not affect the realisation of this paper's research purpose. For scholars after this paper, they can do further research exploration along the research idea of this paper to make up for the shortcomings. For example, the use of full-volume data to carry out research; the combination of data analysis and field interviews to strengthen the field law enforcement process research, which can avoid the subjectivity of the exploration stage, and so on. At the same time, the research ideas and methods adopted in this paper can be extended to other administrative law enforcement departments, such as health law enforcement departments, education law enforcement departments, etc., which will be conducive to the optimisation and promotion of law enforcement effectiveness.

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