

**Fraud detection at Rural Credit Banks in Riau Province until the 2019 Financial Report**Nicholas Renaldo <sup>1</sup>, Sudarno <sup>2</sup>, Suhardjo <sup>3</sup>, Ienne Yoseria Putri <sup>4</sup>, Suyono <sup>5</sup>, Andi <sup>6</sup>, Marice Boru Hutahuruk <sup>7</sup><sup>1-6</sup> Institut Bisnis dan Teknologi Pelita, Indonesia<sup>7</sup> Institut Teknologi dan Bisnis Master, IndonesiaCorresponding Author: **Nicholas Renaldo****Abstract**

The soundness level of Rural Credit Bank in Riau Province raises suspicions about whether it is a natural occurrence or there is fraud in its reporting. This study aims to detect accounting fraud at RCB in Riau Province. The sample in this study was 34 banks, with an analysis of Benford's Law first digit distribution. The results showed that 14 banks were indicated to have committed accounting fraud in financial report reporting with indications of mild to severe. The indication of fraud is not about the company experiencing a loss, but on the management of bank funds

that are not used properly or there is manipulation for the benefit of internal management. Recommendations that can be given are for banks that are indicated to be able to improve internal control. The uniqueness of this research is the use of Benford's Law in assessing the quality of financial reports as well as the proven financial performance of several samples of rural credit banks that have actually gone bankrupt. Then indirectly these findings can use the Benford's Law method to detect early indications of company bankruptcy, especially in rural credit banks.

**Keywords:** Auditing, Fraud Detection, Benford's Law**JEL Classification:** G21, G33, M42**Introduction**

The main purpose of establishing a business entity is to get a profit which will then be used to maintain the business or expand the business network. One of the business entities that have a crucial role in the economy is a bank. Banks carry out an intermediation function, collect funds from households, companies, and the central bank, and then channel them to companies, governments, and households that need loans (Allen & Carletti, 2012)<sup>[1]</sup>.

In carrying out this function, of course, banks must report their financial reports accurately to the Financial Services Authority (Otoritas Jasa Keuangan/OJK) in order to assess the ability of banks to carry out the intermediation function. All banks are required to report this to the OJK, both Commercial Banks and Rural Credit Banks (RCB).

RCB in Riau Province showed low profitability in 2014-2019. The average for 4 consecutive years shows a loss of 57% from the management of bank assets (Return on Assets). The non-performing loan rate of RCB in Riau also shows a number that has exceeded the limit set by Bank Indonesia, which is 5%. Are the numbers that the bank includes in the financial statements are the numbers that correspond to the actual condition of the bank or are there indications of fraud on the report? With such profitability and bad credit levels, banks naturally would not be able to last long in carrying out their activities.

There are several possibilities that happened to the bank. First, banks do experience profits or losses that are reasonable or occur naturally. Second, the bank's financial statements show an advantage, but this advantage is just manipulation to satisfy the stakeholders. Third, the bank's financial statements show losses, because there are indications of data manipulation for internal purposes, especially those who want to take personal advantage because of information asymmetry (Renaldo, Suhardjo, Putri, Sevendy, & Juventia, 2021)<sup>[31]</sup>.

Forensic accounting is defined as the application of accounting in a broad sense, including auditing, to legal matters for legal settlement inside or outside the court, in the public or private sector. Auditing here refers to collecting and evaluating evidence about information (Renaldo, Suhardjo, Putri, Juventia, & Nur, 2021)<sup>[30]</sup> to determine and report the level of conformity between the information and the established criteria. Thus, forensic accounting consists of investigative auditing and loss accounting (Sumartono, Urumsah, & Hamdani, 2020)<sup>[34]</sup>.

Forensic accounting as a technique developed to assist and evaluate accounting tools against conventional methodologies of fraud investigation, these theories focus on fraud in the integration of financial crimes. Differences in each of these theories open gaps in the literature and framework for forensic accounting techniques for investigating financial crimes and tracking terrorist financing routines and terrorist activities (Olatunji & Aruwaji, 2020)<sup>[24]</sup>.

Some of the skills of a forensic accountant such as analytical skills, communication skills, computing skills, technology skills, and investigative skills are categorized into essential or core skills. According to experience, financial accounting, taxation,

business valuation, business skills, internal control of risk management, communication, and other abilities such as fraud schemes are very important in the future. In addition, some of the skills of forensic accountants that are needed to be improved are financial accounting, legal skills, and risk management internal control (Renaldo, Sudarno, & Hutahuruk, 2020b; Sumartono *et al.*, 2020)<sup>[29, 34]</sup>.

Successful fraud detection requires that individuals consider the possibility of fraud, carry out procedures to find it, and finally, draw appropriate conclusions based on the evidence they have obtained. To achieve this objective, the audit standard requires the auditor, during the planning phase of the audit engagement, to assess sufficient initial likelihood of fraud so that additional testing is performed where appropriate. The risk assessment is associated with the level of auditor skepticism so that the skeptical auditors will identify and weigh the relevance of their additional fraud risk factors (Carpenter, Durtschi, & Gaynor, 2011)<sup>[6]</sup>.

Fraud has become a global phenomenon that occurs in several countries in various industrial sectors. Contamination of accounting values cannot be avoided along with the occurrence of these deviations. Manipulation of various material information in financial statements can mislead users of financial statements and cause investors to make wrong investment decisions, which as a result can cause losses in trying to get a return on investment (Putriyanti & Chayati, 2020)<sup>[26]</sup>.

One theory that explains fraudulent behavior is agency theory, which describes a collaborative relationship between shareholders as owners and management as agents. The relationship between owner and management emerged. When several parties are bound by a contract and agree to work together, a conflict of interest between the parties cannot be avoided. Conflicts of interest occur because of different interests. The increase in the company's financial performance in the form of a high rate of return on the investment that has been made is the expectation of the owner, while management expects high compensation for every work that has been done (Putriyanti & Chayati, 2020)<sup>[26]</sup>. On this basis, this could underlie fraudulent behavior.

To detect fraudulent behavior in accounting data, one can compare the digit distribution of the data set with Benford's Law theoretical distribution. If the accounting data set does not conform to Benford's Law, there is some level of suspicion (Geyer & Drechsler, 2014)<sup>[13]</sup>.

The Benford distribution can be used to infer the overall quality of bank financial statement data in developing market countries, which is less effective in finding problem banks that commit reporting fraud. One possible reason is that the Benford distribution is scale-invariant, and violation of Benford's Law is a sufficient but unnecessary condition for accounting bias (Davydov & Swidler, 2017)<sup>[10]</sup>.

It is a mathematical tool and is one of many ways to determine whether the variable under study is a case of accidental (error) or intentional (fraud) error. Benford's Law can be used in accounting and forensic auditing as an indicator of accounting fraud and costs. In practice, Benford's Law enforcement applications for fraud detection routinely use more than the first digit. Limits on Benford's Law use in detecting fraud and used to detect manipulation in one annual or interim report. The general conclusion is that accounting numbers and financial data are in accordance with Benford's Law (Olatunji & Aruwaji, 2020)<sup>[24]</sup>. To ensure the validity of the Benford test, it is necessary

to show that the data are correct according to the distribution proposed by Newcomb (1881) and Benford (1938)<sup>[2]</sup>, while the manipulated data follow a different distribution. There are many reasons other than deception why the regression coefficient deviates from Benford's law. Hence, the hypothesis that the data are Benford distributed (the official null hypothesis of the Benford test) and the hypothesis that the data are not manipulated may not be the same. This increases the chance of a 'false positive' test result (Diekmann & Jann, 2010)<sup>[11]</sup>.

The use of Benford's Law was studied by several researchers and resulted in various conclusions regarding the data tested. Research (Cai, Faust, Hildebrand, Li, & Zhang, 2020)<sup>[4]</sup> shows that this law is very accurate in a series of mathematical numbers. As is known from the introduction of accounting, financial reports are composed of various transaction data grouped by account and compiled into reports. Of course, financial reports will be very systematic and mathematical with a series of numbers.

Combining with statistical models and data mining models (classification, grouping, outlier detection), building a composite testing model based on Benford's Law can effectively solve existing data and method problems in law enforcement, which can make great progress in the following aspects: addressing data defects, strengthen test methods by making use of other methods and correct test errors (Li *et al.*, 2019)<sup>[18]</sup>.

Benford's Law defines the probability of a number at the first four positions in a number. This is similar to the conception of quantitative audit materiality. Quantitative audit materiality is the threshold above which misinformation in financial statement items is considered to have an impact on decision making by users. The methods and ranges of audit materiality vary across audit firms and audit engagements (Tammaru & Alver, 2016)<sup>[35]</sup>.

Benford's Law can be used as a test of the honesty or validity of scientific data that is said to be random in the context of social science. Auditors have long used various forms of digital analysis when performing analytical procedures. Auditors often review payment amounts to check for duplicate payments. They also look for missing checks or invoice numbers. Benford's Law as applied to audit is simply a more complex form of digital numerical analysis. Check the entire account to determine if the numbers match the expected distribution (Durtschi, Hillison, & Pacini, 2004)<sup>[12]</sup>.

Benford's Law is useful and applies to detecting a number of abnormal patterns given the high costs associated with corporate fraud. The fact that the distribution of false numbers underlying fraudulent financial reporting can easily be flagged by Benford's Law is recognized by the courts as well as by firms developing general audit software. However, specialist auditing software is very expensive and beyond the reach of smaller accounting firms and organizations. Applying Benford's Law using a commonly available spreadsheet package is invaluable to accounting and finance professionals (Kuruppu, 2019)<sup>[17]</sup>. This research also proves that this law detects abnormal data in accounts receivable data, but does not detect it in sales data.

Research (Nigrini, 2015)<sup>[20]</sup> shows the existence of Benford's Law patterns on daily stock returns, stock transaction volume, expected returns, abnormal returns, balance reports, income (loss) reports, cash flow reports, and other reports. This was also found in research (Nigrini,

2019) [21] and (Silva, 2016) [32]. Meanwhile (Geyer & Drechsler, 2014) [13] in their research concluded that the pattern in the company's asset report value follows Benford's Law in both the first and second digits, but is not in accordance with this law on the company's debt statement. (Cerioli, Barabesi, Cerasa, Menegatti, & Perrotta, 2019) [7] shows that the international trade balance follows the distribution of Benford's Law.

Several other studies related to the application of Benford's Law were also researched by (Cai, Faust, Hildebrand, Li, & Zhang, 2019; Cai, Hildebrand, & Li, 2019; Hassler & Hosseinkouchack, 2019) [3, 5, 15]. Each researcher with different objects detected fraud or did not follow a theoretical distribution. Based on this phenomenon and research gap, the hypothesis in this study is:

H<sub>1</sub>: There are indications of fraud in the financial statements of Rural Credit Banks in Riau Province

**Research method**

This research was conducted in Pekanbaru City, Riau Province. The object of this research is the Rural Credit Bank (RCB) in Riau Province. This research was conducted in 2020 with research data from 2014-2019. Data collection uses a literature study where the researcher recapitulates financial data that can be obtained from representatives of the Financial Services Authority in Riau Province along with other data that can support research.

The population in this study were 34 RCBs in Riau Province. While the sample used is the entire population. Overall sampling is intended so that the results of the study can explain completely the condition of the bank which is closer to the truth.

This study uses Benford's Law analysis with a quantitative descriptive approach. Researchers will collect the first digit of numbers that can be found on bank financial statements, then perform a Chi-Square analysis to see the distribution pattern of the actual data with Benford's Law. If the Chi-Square test cannot be carried out due to several assumptions, the Binomial test will be carried out.

Some of the formulas that will be used include:

The frequency of the first digit follows a logarithmic relationship (Benford, 1938) [2]:

$$F_a = \log\left(\frac{a + 1}{a}\right) \tag{1}$$

F<sub>a</sub> : Frequency of digit a at first place

a : first digit

The formula can also be simplified to:

$$F_a = \log(1 + a^{-1}) \tag{2}$$

After obtaining the data frequency and frequency according to Benford's Law, the Hypothesis Test of Unequal Expected Frequencies (Chi-Square Analysis) will be used with the following formula (Lind, Marchal, & Wathen, 2018) [19]:

$$X^2 = \sum \left[ \frac{(f_o - f_e)^2}{f_e} \right] \tag{3}$$

X<sup>2</sup> : Chi-Square Test

f<sub>o</sub> : Observed Frequencies

f<sub>e</sub> : Expected Frequencies

If on an event one of the data contains numbers that cannot be analyzed using Chi-Square, then the Binomial Probability Test and a simple Sign Test will be used. The formula to be used is (Lind *et al.*, 2018) [19]:

Binomial Probability Distribution

$$P(x) = C_x^n \pi^x (1 - \pi)^{n-x} \tag{4}$$

P(x) : Binomial Probability if n < 10

C : Combination

x : Random variable defined as the number of successes or + sign(s)

π : Probability of a success on each trial (50%)

**Table 1:** Distribution of Benford's Law

Benford's Law Appear Number	Probability Appear in the n-digit		
	1	2	3
0		0,11968	0,10178
1	0,30103	0,11389	0,10138
2	0,17609	0,10882	0,10097
3	0,12494	0,10433	0,10057
4	0,09691	0,10031	0,10018
5	0,07918	0,09668	0,09979
6	0,06695	0,09337	0,09940
7	0,05799	0,09035	0,09902
8	0,05115	0,08757	0,09864
9	0,04576	0,08500	0,09827
Total	1,00000	1,00000	1,00000

Source: Self calculated based on Benford's Law formula, 2021

It can be seen that the first digit does not follow a uniform distribution which is often considered a fair number distribution. This applies to the natural distribution of numbers, especially financial data. The second digit still does not follow a uniform distribution. Whereas for the third digit and so on, it almost follows the distribution that is usually considered reasonable, which is close to one-tenth (1/10) based on the basic theory of the probability of the expected frequency of each number to appear.

Hypothesis testing uses the help of the Microsoft Excel and SPSS program where if the value of Sig < α then there is an indication of fraud in the Rural Credit Bank financial statements. All tests will be reinforced with Bootstrap and Monte Carlo simulations if required. Bootstrap experiments generate samples by resampling observed data multiple times. The sample is treated as an unknown population from which it can be drawn using replacement. The Bootstrap method is used when the underlying data distribution is unknown. Monte Carlo experiments are an alternative method of generating new samples from historical data. The main difference is that the samples are generated in the Monte Carlo simulation by drawing from the distribution of the analytic hypothesis (Hafni, Renaldo, Chandra, & Thaeif,

2020; Nyoto, Renaldo, Karuppanan, Bhuiyan, & Kumarasamy, 2021; Pažický, 2017; Renaldo, Sudarno, & Hutahuruk, 2020a) [14, 23, 25, 28].

If the results are significant, 10% will be categorized as an indication of mild fraud, 5% as an indication of moderate fraud, 1% as an indication of severe fraud, and further away from 1% will be categorized as an indication of very serious or even extreme fraud. This is because the aim of the analysis is to see how far the data deviates from Benford's

Law distribution and is significant at 10%, which is closer to the theoretical distribution than significant at 1%. This also applies to the calculated statistical value, which is smaller, meaning the closer to the theoretical distribution.

**Results**

Based on the results of Benford's Law analysis, there are several things that need to be discussed further. Summary of test results according to table 2.

**Table 2:** Benford's Law Test Results on RCB in Riau Province

No	Code	Sig. of Chi-Square Test	Sig. of Binomial Test <sup>a</sup>	No	Code	Sig. of Chi-Square Test	Sig. of Binomial Test <sup>a</sup>
1	DNAM	0,780		18	HTMD	0,397	
2	GMLG	0,166		19	IDMT	0,611	
3	RKHL	0,013		20	MNDR	0,002	
4	RKHU	0,160		21	MDRJ	0,038	
5	IDAT	0,281		22	MTAT		0,246
6	SRMD	0,001		23	NSTR	0,848	
7	ANGR	0,086		24	PYNG	0,055	
8	ASSJ	0,002		25	PKBR	0,149	
9	ATMG	0,022		26	PMRA	0,010	
10	BMRA		0,246	27	PTRA	0,000	
11	CPKM		0,070	28	TRBN	0,073	
12	CPKW	0,232		29	TANG	0,000	
13	DTDN	0,000		30	TNMT	0,372	
14	DMKP	0,107		31	UNST	0,529	
15	DTPD	0,323		32	MTRY	0,402	
16	FZPD		0,164	33	UNVS	0,150	
17	FAKR	0,295		34	PTMK	0,921	

a. Exact Results are provided instead of Monte Carlo for this test.

Source: Processed data, 2021

The use of Exact Results is because it uses the binomial test. The binomial test is used because there are data that cannot be analyzed by Chi-Square. Since there are only 9 data points (digits 1-9), a Monte Carlo simulation is required. Because the SPSS program analyzes, the program suggests using the exact results to make them more accurate because the amount of data is small.

As many as 14 out of 34 banks have indications of fraud on their financial statements. This means that it is not in line with Benford's Law. Research related to 14 banks is in line with research (Geyer & Drechsler, 2014; Kruger & Yadavalli, 2017; Kuruppu, 2019; Nigrini & Miller, 2007; Qin *et al.*, 2019) [13, 16, 17, 22, 27] on their respective research objects. So that this research hypothesis is accepted. Meanwhile, 21 other banks that do not have indications of fraud in their financial statements (following Benford's Law) are in line with research (Geyer & Drechsler, 2014; Kruger & Yadavalli, 2017; Kuruppu, 2019; Nigrini, 2015; Nigrini & Miller, 2007; Qin *et al.*, 2019; Striga & Podobnik, 2018) [13, 16, 17, 20, 22, 27, 33] on their respective research objects.

The indication of RKHL Bank fraud is significant at 5% which is in the moderate category. The main reason is that this bank does not report reports for 2015 and 2016. In terms of bank profit, it is still considered good because in 2014, 2017, and 2019 it reported profit. The indication of fraud at the SRMD Bank was significant at 1% which was categorized as severe. The main cause is the incompletely reported 2014 report, losses for 3 consecutive years starting from 2016-2018, then also the very large lending when compared to other banks.

The ANGR Bank indication of fraud is significant at 10% which is included in the mild category. This bank has suffered losses from 2015-2019. This bank also experienced

a sharp decline in assets for 2 years, as well as a high level of bad credit (NPL). The indication of ASSJ Bank fraud is significant at 1% which is categorized as severe. This bank is experiencing positive profit growth, but why is it in the severe category? Keep in mind that a business entity reporting positive returns is not necessarily a good thing. After further investigation, the composition of credit to bank funds (LDR) was considered unsatisfactory in 2014-2016. It is still uncertain whether this happened naturally or if there was data manipulation considering that Benford's Law can only be used to determine financial data anomalies, but it still has some weaknesses. In this bank, significant anomalies in the first digit 7 are found in the cost component and third-party funds.

The ATMG Bank fraud indication is significant at 5% which is included in the moderate category. At first glance, there appears to be no oddity in the bank's financial statements. The anomaly is found in number 2 which is mostly found in bank profits. Then the next number is 8 which can be found in the components of income and operating costs. Of course, the numbers 2 and 8 found are related to the bank's profit (loss) statement. There needs to be a further review of this report because after all the bank owner certainly does not want real or fictitious revenue or costs to be included or not included. Indications of significant CPKM bank fraud at 10% are considered mild. This bank was liquidated in 2014 and closed in 2019. In terms of bank health, this bank is not able to meet the standards. It is not yet known why this bank is closed but its financial performance is not good enough. The indication of DTDN Bank fraud is significant at 1%, even far below 1% which is in the very severe category. This bank has a very volatile loss. Meanwhile, Benford's Law analysis shows an indication of the first digit 3 found in

bad credit, the components of assets and current debt (in relation to the current ratio and work capital). Of course, this bad credit will be closely related to bank liquidity and working capital. A healthy bank certainly has good value but not this bank. The finance director must be independent and pay attention to this composition. The indication of MNDR Bank fraud is significant at 1% which is categorized as severe. This bank does not report its report in 2019. The analysis shows an anomaly at number 3, which is mostly found in capital, profit, credit, and assets.

The indication of MDRJ Bank fraud is significant at 5% which is in the moderate category. The bank is incomplete in reporting the 2014 report. Profit is still consistently good but anomaly is found in the first digit 8 which is found in the amount of savings and amount of credit. Whether this is an indication of fraud on customer funds or not is still uncertain. The indication of PYNG Bank fraud is significant at 10% which is included in the mild category. Benford's Law analysis refers to number 6 related to bank assets. There is still no problem with this bank. From the profitability side, it does not show any suspicious indication of fraud. This could be because the first possibility is that the financial statements that contain anomalies are indeed normal and have been reported honestly by the PYNG bank or Benford's Law which still cannot emphasize where the fraud occurred. In this case, there is a possibility of a type I error where the researcher rejects  $H_0$  even though  $H_0$  is true (false positive).

The indication of PMRA Bank fraud is significant at 1% which is categorized as severe. The highest anomaly is number 7 which is found in credit, customer funds, and operational costs. These three items are crucial for the bank and if there is fraud, it will be very dangerous for customers who transact here. But this is just an indication considering Benford's Law can't go that deep. The indication of PTRA Bank fraud is significant at 1%, even far below 1% which is categorized as very severe. This bank was closed in 2018. This bank was also incomplete to report its obligations in 2014. In almost all elements of the compilation of financial statements, there is a number 1 which forms a very high anomaly. This result is very unnatural when referring to Benford's Law theory.

The indication of fraud at the TRBN Bank was significant at 10% which was categorized as mild (light). The 2014 report is incomplete, and the highest anomaly is at number 7. This figure is found in the value of customer savings, credit value, and operating costs. The last indication of fraud was TANG Bank which was significant at 1%, even far below 1% which was categorized as very severe. Of all the banks analyzed, this TANG Bank is very heavy, it can even be said to be extreme (significant at 0.00001283). The most extreme number in Benford's Law analysis is in the first digit of 8. This number is very much found in credit and customer funds, even more so than banks that have been previously analyzed. This bank has poor liquidity and unsatisfactory solvency.

Banks that are not indicated to have committed accounting fraud have a first-digit distribution pattern that follows Benford's Law. The best bank in participating in this distribution is PTMK Bank. From the composing elements of the financial statements, it shows that the distribution of the first digit is quite consistent, especially at the prefix 5 found in customer funds, profits, capital, and operating costs. Of course, if consistency in the management of these

funds will make the bank's performance better without any fraud. The PTMK bank experienced losses in 2016 and 2017, considering that this bank was only inaugurated in 2016 but there are still no indications of fraud. This proves that even a bank that has suffered a loss has no indication of fraud if the report is in accordance with the actual situation.

This analysis is also found to be able to detect early company bankruptcy (Davydov & Swidler, 2016)<sup>[9]</sup>. The analysis is based on the distribution of numbers to assess the quality of bank financial reports. It is evident from several banks that are already bankrupt showing this indication. Further development regarding this method can be carried out as a tool to detect bankruptcy. In addition to indications of bankruptcy, assessment of bank performance can also be detected indirectly.

Agency theory is very influential on the operational conditions of a bank where stakeholders usually do not directly manage the bank. They entrust the management of the bank to the director and only supervise it through an independent board of commissioners. If the director acts arbitrarily without stakeholder approval, asymmetric information (Chandra, Renaldo, & Putra, 2018)<sup>[8]</sup> will occur which can lead to fraud, both minor and severe.

Weaknesses in Benford's Law were stated by (Hassler & Hosseinkouchack, 2019)<sup>[15]</sup>. Doubts about the usefulness of the Newcomb-Benford Law for detecting fraud in economic and related data, are due to the hypothesis that the data was distributed by Benford's Law and the hypothesis that the data were not manipulated cannot be simultaneously tested. There are other reasons besides being a scam for deviance from Benford's Law. However, if there are compelling reasons to believe that non-manipulated data should be met, then rigorous testing should be implemented to detect fraudulent breaches.

### Conclusions and recommendations

From the analysis, there are several banks that are indicated to have committed accounting fraud, ranging from minor to severe. There are indicated banks that get consistent profit and loss in a row. Meanwhile, for banks that had no indication of fraud, there were also those that experienced profit or loss, but with Benford's Law analysis, no indication was found. Indications of fraud are not about companies that have suffered losses, even companies that have earned profits can be indicated. Indications of fraud were found when the management of bank funds was not used properly or there was manipulation of data for the benefit of internal management.

This analysis is also found to be able to detect early company bankruptcy. The analysis is based on the distribution of numbers to assess the quality of bank financial reports. It is evident from several banks that are already bankrupt showing this indication. Further development regarding this method can be carried out as a tool to detect bankruptcy.

Recommendations that can be given are for banks that are indicated to be able to improve internal control by implementing both manual and integrated systems. The purpose of implementing these two types of controls is to minimize the possibility of fraud. Fraud can occur due to incidental opportunities or opportunities that are deliberately arranged by the bank's internal parties. The weakness of this research is the fraud detection methodology which has been found for a long time, and this method is still unable to

detect precisely or specifically where the fraud occurs. It is hoped that the next research will be able to develop a better methodology in fraud detection through the distribution of statistical data.

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