

**ONLINE LOAN GROUPING ANALYSIS OF FINANCIAL TECHNOLOGY (FINTECH)
PLATFORM-BASED FOR MSMEs IN INDUSTRY 4.0 WITH NAÏVE BAYES
STATISTICAL METHOD**

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Abstract: UMKM (Micro, Small and Medium Enterprises) is one of the Indonesian economy driving forces currently as the foundation of various sectors. Along with the growth of information technology that has increased sharply, many digital applications have been developed that offer convenience to the public, especially in terms of inclusion of funds as working capital, this has indirectly been broadly used by MSME players in seeking working capital in a short way. Peer to Peer Lending / P2PL (Fintech) or commonly referred to as an application online lending-based institutions, currently many have been present in the community either through licensed or unlicensed through the OJK Institution. As of October 14, 2020, OJK has released data on as many as 157 Legal Peer to Peer Lending Companies, while the number of Unlicensed P2PLending Institutions reported to OJK is around 2400, in the research conducted only 108 data were taken. From the data processing using the naïve Bayes method in determining the grouping / classification, it is found that 50% of P2PL companies carried out activities with the Very fraudulently Category, 33% are quite fraudulently and 17% not fraudulently. With the release of research results, it is hoped that MSME players in obtaining loans online can be more vigilant in determining which institutions to appoint in venture capital participation.

Keywords: *Peer to Peer Lending, Naïve Bayes, UMKM*

1. Introduction

Currently the Government is trying to revive the economy of its people in facing Industry 4.0 by providing facilities - easiness in obtaining business capital using technology-based devices, Technology-Based Financial Institutions (FINTECH) are a term that we are currently familiar with, in general, Fintech institutions according to the common people are often referred to as Online / Peer to Peer Lending fund lending institutions. Based on Financial Information Data presented by the Financial Services Authority (OJK) as of May 2019, the number of

registered and licensed Fintech institutions is 113 companies. Then what about the number of other Fintech institutions whose numbers currently range in the hundreds (300 - 500) with unregistered / unlicensed status at the OJK, for that the government issued an appeal to the public to properly utilize registered Fintech institutions. Along with the development of the business world, especially for MSME business actors who are currently growing and developing a lot, of course business actors really need an injection of business capital, because the desired funding needs must be available quickly, this is certainly an opportunity for financial business actors who unauthorized (Fintech) to take advantage of the moment of need for provision of funds to MSME Business Actors who in the process of distributing loan funds to business people have committed many violations of the law. The phenomenon that occurs in the field is interesting to research, because almost every time there are many violations in the process of channeling funds through fintech institutions, many ordinary people do not know fintech institutions well about the rules and procedures for submitting personal data when applying for loans through ONLINE media. Based on statistical data acquired from katadata.co.id website, the trend in utilizing peer to peer lending companies carried out by MSME Companies has increased, from (Figure 1) graphical data obtained, in October 2018 number of P2P Lending Borrowers has reached 2.8 Million accounts (*Jumlah Peminjam Fintech P2P Lending Mencapai 2,8 Juta Akun / Databoks, n.d.*)

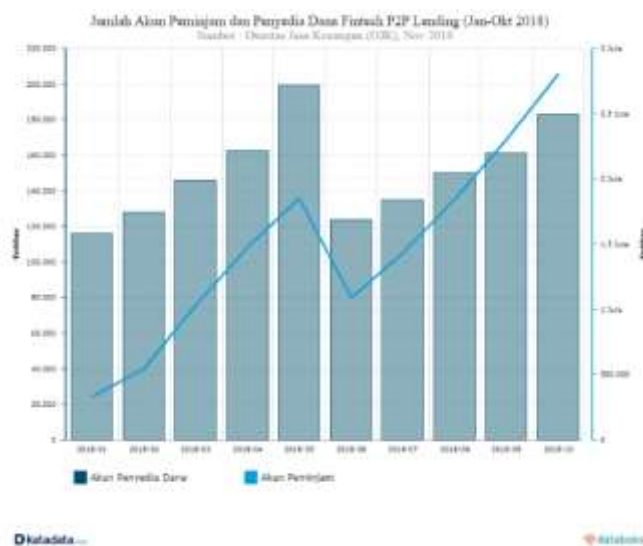


Figure 1. Number of P2P Lending by Katadata.co.id site

2. Literature Review

Definition of Fintech / Technology-Based Financial Institutions. According to the Financial Services Authority (OJK), what is meant by Fintech is an innovation in the financial services

industry that utilizes the use of technology. Fintech products are usually in the form of a system built to carry out specific financial transaction mechanisms (Otoritas Jasa Keuangan, 2016). Specifically, there is a term in technology-based financing institutions, namely the term Peer to Peer Lending, Peer to Peer Lending is a new method that allows someone to lending funds through a loan application - a loan application site whether using collateral or not (Setiadi Saputra, 2019).

Definition of MSMEs

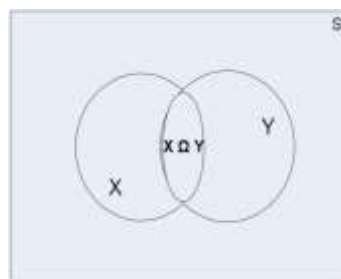
Based on Law Number 20 of 2008 concerning Micro, Small and Medium Enterprises (MSMEs), there are several criteria used, among others (a) Micro Enterprises, (b) Small Businesses, (c) Medium Enterprises (Kristiyanti & Lisda Rahmasari, 2015).

Definition of Classification / Grouping

Definition of classification is a method for arranging data systematically or according to some rules that have been applied, literally it can also be said that classification is a division according to classes or based on similarities and differences characteristics (*Klasifikasi - Wikipedia Bahasa Indonesia, Ensiklopedia Bebas*, 2020).

Definition of Naïve Bayes

The Bayes method is a statistical approach to induced inference on classification problems. This method uses conditional probability as the basis (Adityo & Miawarni, 2017).



Bayesian Method

Probability of X in Y is the probability of intersecting X and Y from the probability of Y, or in other words $P(X | Y)$ is the percentage of the number of X in Y. In addition to data as above, the Naive Bayes method can also handle numerical data. To handle numerical data, the Naive Bayes method uses the assumption of a normal distribution. The formula is as below

$$\mu = \frac{1}{n} \sum_{i=1}^n x_i$$

$$\sigma = \sqrt{\frac{1}{n-1} \sum_{i=1}^n (x_i - \mu)^2}$$

$$f(w) = \frac{1}{\sqrt{2\pi}\sigma} e^{-\frac{(w-\mu)^2}{2\sigma^2}}$$

(1) Naive Bayes Equation

3. Research Methodology

In research, data processing stages from beginning to end are described in the following research methods:

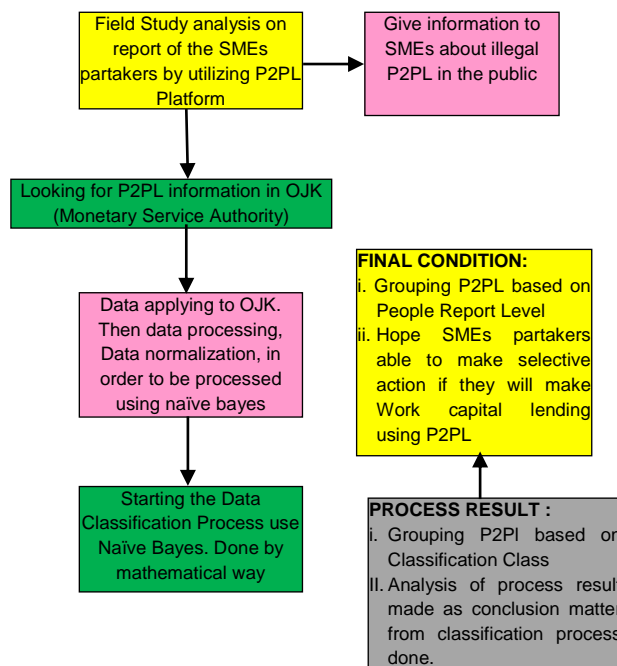


Figure 3.1 Research Method Graphic

a. Research Locations and Procedures for Obtaining Data

This research was carried out by evaluating data obtained from the Financial Services Authority (OJK), namely in the form of detailed information on Peer To Peer Lending companies in Indonesia, we also did how to obtain data by following procedures requested by the Financial Services Authority (OJK). The first process carried out is by applying for permission to obtain official Peer to Peer Lending data in Indonesia, namely by submitting an Official Assignment Letter from the Bhayangkara University Campus, Surabaya with Number: ST / 057 / VI / 2020 / LPPM / UBHARA.



Figure 2. Assignment Letter of Data Request to OJK

From the efforts made, it is obtained 2 types of Peer To Peer Lending company categories, namely companies both licensed and unlicensed. For the licensed peer to peer lending company category, this data can be attained directly on the Financial Services Authority (OJK) website, from data field, until August 14, 2020, there are 157 of P2P Legal Lending Companies (OJK, 2020) with technology-based platforms such as Android, Mobile IOS and so on.

PERUSAHAAN FINTECH LENDING BERIZIN DAN TERDAFTAR DI OJK

PER 14 AGUSTUS 2020

Data Usaha Terdaftar

No	Nama Platform	Website	Nama Perusahaan	Siapa Sudah Berizin/Terdaftar	Tanggal	Siapa Usaha	Siapa Operasi
1.	Banana	https://p2p.banana.co.id	PT Peer Data Payment	KIP-4010-05/2017	06 Juli 2017	Konvensional	Android
2.	Intromax	https://www.intromax.id	PT Intromax Solusika Jaya	KIP-4010-05/2019	13 Mei 2019	Konvensional	Android dan iOS
3.	ananta	https://ananta.com	PT Ananta Mitra Pustaka	KIP-4610-05/2019	13 Mei 2019	Konvensional	Android
4.	DOMPET KAHU	https://www.dompetkahu.co.id	PT Indo Fia Titik	KIP-4310-05/2019	13 Mei 2019	Konvensional	Android
5.	KIMBO	http://kimbo.co.id	PT Cendekia Mobile Advertisment	KIP-4810-05/2019	15 Mei 2019	Konvensional	Android
6.	TOKO MUDAL	https://www.tokomudal.co.id	PT Toko Mudal Mitra Usaha	KIP-4810-05/2019	24 Mei 2019	Konvensional	Android
7.	CANGTEMAN	https://cangteman.com	PT Digital Alpha Indonesia	KIP-5010-05/2019	24 Mei 2019	Konvensional	Android
8.	ananta	https://ananta.com	PT Mitrausaha Indonesia Group	KIP-5110-05/2019	30 September 2019	Konvensional	Android
9.	KTA KILAT	http://www.pendanaan.com	PT Pendanaan Teknologi Nusantara	KIP-4210-05/2019	30 September 2019	Konvensional	Android
10.	Kredit Pintar	http://kreditpintar.co.id	PT Kredit Pintar Indonesia	KIP-4910-05/2019	30 September 2019	Konvensional	Android
11.	Siaraah	http://siaraah.id	PT Siaraa Webin Digital Arts	KIP-0410-05/2019	30 September 2019	Konvensional	Android
12.	Finans	https://www.finans.co.id	PT Citraer Mitra Kapital	KIP-0510-05/2019	30 September 2019	Konvensional	Android

Figure 3. List of P2P Lending Legal Companies (OJK)

Meanwhile, the number of Peer To Peer Illegal Lending companies, which we have obtained through the data request process, was sent to the Financial Services Authority (OJS), as of March 14, 2020, the researcher received database records from the OJK, namely 2402 companies.

Data collection technique

Data collection technique used is to compare the Peer To Peer Lending list obtained from the Financial Services Authority (OJK) with data obtained from the Internet based on the reporting process to the public - peer to peer lending companies that have committed violations in providing loans to Loan service users. One of the data we obtain from online news is that at least the AFPI (Joint Funding Fintech Association) has received 3,726 reports of violations with the most cases, namely the matter of loan billing (Kontan.co.id, 2020).

4. Results

System testing is a test in entering data into the forms provided. At this stage the test was carried out using 108 Unlicensed / Illegal Fintech Institution Report Data, training data on the system. Based on the test results from 108 training data, it was found that there were 97 data that matched the actual class (according to the report).

Table 4.1

Results of Testing the Data Acquisition System for Illegal Fintech Data reports period 2019 – 2020

NO	ID P2PL	Month	Number of report	Number of Illegal Fintech has been reported	New illegal Fintech Data
1	P2PL1	Jan	56	99	4
2		Feb	45	90	8
3		Mar	68	95	5
4		Apr	50	94	7
5		May	61	96	3
6		June	53	97	2
7		July	65	92	7
8		Aug	50	93	0
9		Sept	43	95	1
10		Oct	47	91	8
11		Nov	64	93	6
...	
16		Apr	55	94	7
17		May	43	92	4
18		June	65	96	5
19	P2PL19	Jan	56	97	1
20		Feb	45	98	7
...	
25		Jul	55	93	5
26		Aug	43	95	2
...
...
108	P2PL108	Jun	45	98	7

* P2PL = Peer To Peer Lending

From the data, it will be classified by the Naïve Bayes method into several classes, where this class is determined based on the standard probability value, while class in the division of Peer to Peer Lending (Illegal) Companies is as follows:

- 1) Very fraudulently .
- 2) Quite Fraudulently.
- 3) No fraudulently.

4.1 Results And Discussion

Accuracy results taken from calculations using the Naïve Bayes classification method are:

Table 4.2 Classification of Fintech P2PL

No	Classification Status	Number of P2PL has been reported	Real Number of P2PL	New Number of P2PL
1	Very fraudulently	68	95	5
2	Quite Fraudulently	65	96	5
3	No Fraudulently	47	91	8

Table above is result of classification calculations from Unlicensed Peer To Peer Lending data using Naïve Bayes Classification. Based on the data above, the following is a graph of the classification results with the Naïve Bayes algorithm. The data shows that 50% of Illegal P2PL Companies are very fraudulently, 33% are in the Quite fraudulently and 17% are in the Non-fraudulently of P2P Lending.

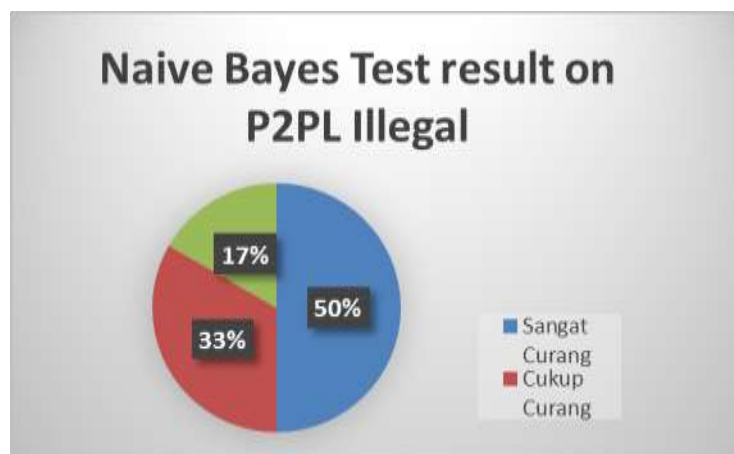


Figure 4.1 Result Diagram

From classification processes sequences that have been carried out using Naïve Bayes method, the following results can be obtained:

- 1) 54 of P2P Lending Companies (Illegal) are included in the 'Very Fraudulently' Category. (50%).
- 2) 36 of P2P Lending Companies (Illegal) are included in the "Quite Fraudulently" Category. (33%).
- 3) 18 of P2P Lending Companies (Illegal) are Included in the 'No Fraudulently' Category. (17%).

5. Conclusion

Based on the results of the research and discussion that has been done, it can be concluded that the Naïve Bayes Classification algorithm can be used as a method for classifying the level of the Fintech / Peer to Peer Lending Company group. All Peer to Peer Lending companies that do not have a license to commit various frauds, from the results of the sampling data test, 50% of them carried out activities very fraudulently, 33% were quite fraudulently and only 17% were not fraudulently.

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