

User Satisfaction Analysis of Paylater Services Using K-Means Algorithm in Campus

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Submitted: 14/11/2022; Accepted: 12/12/2022; Published: 30/12/2022

Abstract-In the 4.0-based digital era, the use of e-commerce is increasing. The convenience provided to e-commerce users is increasingly being considered by companies engaged in e-commerce. Paylater is a fairly new payment method among Indonesian e-commerce, so research is needed to improve the service and satisfaction of e-commerce users, especially those using the paylater payment method. The purpose of this study is to analyze user satisfaction with paylater services using the k-means algorithm on campuses in region 3 Cirebon. This research is also to find out the benefits of paylater used by students. This research is a type of quantitative research using the k-means algorithm to determine the classification of paylater user satisfaction in several e-commerce applications at several universities in region 3 Cirebon which is then clustered. The results of the study show that Cirebon students in the Campus 3 area are satisfied with services from companies or online shops that have paylater payment facilities.

Keywords: Paylater; Studebt; E-Commerce; Customer Satisfaction

1. INTRODUCTION

In 2022, technology has developed a lot. These developments have a huge impact on the world, one of which is the commercial sector. Technology has made the transaction process very fast, easy and efficient. People who originally had to go to shopping malls are now spoiled by the abundance of e-commerce with various payment options [1]. The existence of e-commerce has changed consumer behavior, where previously offline shopping was only limited to going directly to the mall, market, or store itself, now it can be easily done online at home. The biggest reason for the change in purchasing behavior patterns from direct purchases to online purchases is because of the basic convenience offered from online stores, but despite the many conveniences offered there are still factors that are the reason why some customers do not choose to shop online, including the risk factors for fraud, both in terms of quality and payment system [2]. The ever-evolving payment system is one of the supporting factors for the development of e-commerce. The payment system, which is one of the elements supporting system stability, has also developed from only accepting cash payments. Up to use paylater. Payment methods provided by e-commerce usually use bank transfer methods, e-wallets, virtual accounts, credit cards, cash on delivery, and paylater payments [3].

Paylater is a payment method that resembles payment using a credit card. The advantage of paylater is that it is relatively easy and fast to register using only an identity card, users can immediately use paylater payment services [4]. Similar to a credit card, Paylater provides convenience to meet all consumer needs, from shopping for basic needs to entertainment such as purchasing airline tickets, hotel reservations, recreation tickets, and so on.

Based on data obtained from the Financial Services Authority (2021) as of July 27, 2021, data obtained from 121 fintech lending companies have licenses and are registered with the OJK. Fintech can support good transactions related to lending and borrowing, buying and selling transactions and payments to be more effective, efficient and economical[5]. Fintech is an innovation in financial services that does not require paper money. In other words, the existence of financial technology turns currency into digital currency for efficiency.[6] Paylater users (56.7%) are the third most preferred service after e-wallets (82.7%) and investment apps (62.4%), according to data from the Fintech Report published by DSRResearch. The research was conducted by utilizing primary data of 16 million payment transaction samples from 1.5 million Kredivo user samples in the five largest e-commerce sites in Indonesia. Research will take place throughout 2021 with more than 3,000 respondents from various regions of Indonesia [7].



Figure 1. Paylater services are the most frequently used in Indonesia



Fintech has an important role in improving the performance of SMEs in increasing their efficiency. Efforts must be made by the government to provide access to SME growth and provide assistance related to Fintech, complete with good financial inclusion in the SME-specific community, besides that the Government is obliged to provide licenses aimed at security in the fintech field so that they can be accessed cheaper, faster, and easier [8]. Fintech presents opportunities for anyone to experience practical and realistic transactions anywhere and anytime so that transactions become more effective and efficient [9]. The transformation of consumer opinion with the existence of internet channels that form transactions can be carried out instantly and at that time (real time) is the reason for the advancement of fintech development [10].

There are also several studies that have been carried out previously, including research conducted by Sari (2020), regarding the effect of using paylater on the impulse buying behavior of e-commerce users in Indonesia, in his research explaining that the use of paylater technology is in the very good category. This means that paylater technology, which is a new technology in digital payments, is used very well by e-commerce users in Indonesia. In addition, research conducted by Hardhika (2021), regarding the experience of student paylater users in Surabaya, the results show that the motives of students in Surabaya to use paylater consist of because to motives which include urgency or pressure, utilizing profitable paylater features and utilizing payment system technology that is new and in order to motive includes alternative options to replace credit cards, fast and easy payment solutions and e-commerce or online travel agent strategies for presenting paylater.

There is also research conducted by Asja et al., (2021) concerning the effect of benefits, convenience and income on interest in using paylater, it is explained that perceived benefits and income have a positive and significant influence on interest in using paylater services. This shows that the level of perceived benefits and income will affect the level of interest in using consumers. Then another study conducted by Pakpahan et al., (2022) which examined the effect of using paylater in e-marketing on student impulsive buying behavior conducted at the Faculty of Teaching and Education Sciences, University of Tanjungpura, explained that students have a good perception of paylater and e-marketing but the use of paylater in e-marketing does not have a significant effect on impulsive buying behavior in college students.

Customer satisfaction is very important for the company because it can maintain the existence, continuity and development of the company. Consumer satisfaction is an evaluation of the services or goods purchased that at least provide results that meet or exceed consumer expectations [11]. Paylater services offered by some e-commerce providers have some problems when using their applications such as complicated verification processes, or late fees and interest rates of up to 5% per month which are considered too high [12]. Therefore, the authors analyze whether the Paylater services offered meet consumer expectations. we conducted a survey to analyze customer satisfaction with Paylater services, starting with conducting a questionnaire to Payeleteer service users to determine the level of user satisfaction in using Payleteer, the survey was conducted at universities in the 3 Cirebon area, namely, Cirebon Regency, Cirebon City, Indramayu and Majalengka [13]. The universities that have been surveyed are Gunung Jati Swadaya University, Cirebon Muhammadiyah University, 17 August 1945 University Cirebon, Wiralodra Indramayu University, Indramayu State Polytechnic, Indramayu College of Health Sciences (Stikes), Majalengka University, STMY Majalengka College of Economics, and College of Teacher Training and Education (STKIP) Majalengka.

2. RESEARCH METHODOLOGY

This research is a type of quantitative research with the analysis used is the K-Means Algorithm and Clustering. K-Means is a non-hierarchical data grouping technique that allows you to divide data into two or more groups [14]. This method divides the data into several groups where data with the same characteristics are in the same group and data with different characteristics are grouped in different groups. The objective of clustering is to minimize the objective function defined in the clustering process. In general, we try to minimize within-group variation and maximize between-group variation. Due to its simplicity and efficiency, the K-Means algorithm is one of the most commonly used algorithms for clustering and is recognized by the IEEE as one of the top 10 data mining algorithms. goals that have been set during the clustering process will be minimized [16]. Meanwhile, clustering is a technique for categorizing data into groups. The distance metric plays a very important role in the clustering process. The more similarities between data in a cluster, the greater the chance for certain data items to enter into certain groups [17]. This research was conducted on campuses in region 3 Cirebon.

3. RESULTS AND DISCUSSION

The data used in this study amounted to 1714 consumers consisting of students in region 3 Cirebon, where the location is the Gunung Jati Swadaya University campus, Muhammadiyah Cirebon University, Cirebon University August 17 1945, Wiralodra University Indramayu, Indramayu State Polytechnic, College of Health Sciences (Stikes) Indramayu, Majalengka University, STMY Majalengka College of Economics, and College of Teaching and Education College (STKIP) Majalengka. Sample data from a survey of more than 1,700 student respondents at various campuses in 3 Cirebon regions are shown in Table 1.



Table 1. Questionnaire Result Data

Respondents to.	Respondent Age	Name of Campus / Education Unit	Price	Feature	Verification process	Flower	Fine	Satisfaction Rate
1	23	Universitas Muhammadiyah Cirebon	4	4	4	5	7	3,6
2	23	Universitas Wiralodra	10	7	8	10	6	7.2
3	21	Universitas Muhammadiyah Cirebon	5	8	8	4	6	5.6
4	20	Universitas Muhammadiyah Cirebon	9	1	2	5	2	3,6
5	31	UNIVERSITAS WIRALODRA INDRAMAYU	5	7	5	6	10	5,2
6	43	STAI Pangeran darma Kusuma Indramayu	10	6	1	1	10	4.2
...
1711	23	Stikes Indramayu	5	2	3	10	10	4.6
1712	21	Universitas Majalengka	4	5	7	3	1	4
1713	20	STIKES YPIB Majalengka	8	6	8	7	3	6,4
1714	31	STKIP Muhammadiyah Kuningan	8	2	6	10	10	5,4

Information :

The maximum value given is 10 Points.

The following are the steps for calculating the K-Means Clustering method [20].

a. Determination of the Number of Clusters and Centroids.

The data entered the clustering phase by applying the KMeans algorithm with rapidminer to collect data into two clusters. The selected data will be entered into the Rapidminer application. Then by using the K-Means algorithm, the center or centroid value is generated from the data obtained, by calculating the centroid values one by one 10 times and the best centroid value will be found.

Table 2. Test Result Data

Number of Clusters	Centroid Average Results	Davies Bouldin
K2	51,514	1,246
K10	28,615	1,528
K8	31.128	1.535
K9	29,784	1,550
K7	32,660	1,655
K6	34,646	1,677
K5	37,409	1,728
K4	40,847	1,785
K3	45,674	1976

It was found that the lowest bouldin devies were in the 2 cluster experiment. then it is determined that the number of clusters in this study is K2 because it has the lowest bouldin devies.

b. Determining Clusters or Grouping

In the test results using the rapidminer application, it has been divided into 2 clusters, namely K0 and K1. The division is in table 3: Cluster Grouping Data

Table 3. Cluster Grouping

Respondent	Age	Price	Feature	Verification process	Flower	Fine	Satisfaction Rate	cluster
1	23	4	4	4	5	7	3,6	cluster_0
2	23	10	7	8	10	6	7.2	cluster_0
3	21	5	8	8	4	6	5.6	cluster_0
4	20	9	1	2	5	2	3,6	cluster_0
5	31	5	7	5	6	10	5,2	cluster_0
6	43	10	6	1	1	10	4.2	cluster_1
7	31	8	7	3	8	6	5,8	cluster_1
...
1711	23	5	2	3	10	10	5	cluster_0
1712	21	4	5	7	3	1	4	cluster_0
1713	20	8	6	8	7	3	8	cluster_0
1714	31	8	2	6	10	10	8	cluster_1



Based on the results of testing the data tested with Rapidminer, it can show the results of 1714 consumers where the highest cluster results are 1455 consumers who are satisfied with the services provided by the company, while the lowest cluster indicator is 259 consumers who are satisfied. satisfied with the services provided by the company, based on the results obtained, it can be concluded that Cirebon students in the 3rd campus area are satisfied with the services of companies or online shops that have paylater payment facilities.

4. CONCLUSION

Based on the research that has been done, it can be concluded that Cirebon students in the Campus 3 area are satisfied with services from companies or online shops that have paylater payment facilities. This is evidenced by 1714 consumers, as many as 1455 consumers were satisfied with the services provided by the company.

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