

CHAPTER 1 INTRODUCTION

1.1. Background

In today's digital era, the rapid development of information technology significantly impacts various aspects of life, particularly in the trade and retail sectors. Understanding customer preferences is crucial for adapting to market demands. One of the key challenges in this area is effectively managing customer needs as reflected in sales reports, ensuring that the supply of goods operates efficiently.

Pekanbaru Jaya Building Shop, located at Villa Fajar Indah II, Jl. II Barau-Barau Blok A-8, Kel. Sialang, Kec. Tenayan Raya, Pekanbaru, specializes in selling a variety of building materials to meet household needs. Currently, sales reports are recorded conventionally on an annual basis. Given the wide range of products offered, this method makes it difficult for shop owners to obtain accurate data regarding customer preferences. Consequently, the store risks overstocking items that are less desirable while understocking popular products. To address these challenges, clear and accurate sales reports are essential, allowing store owners to better balance customer demand when restocking supplies.

To achieve this goal, it is essential to apply the appropriate data mining method to extract valuable insights from existing sales reports. One widely used approach in the data mining process is CRISP-DM (Cross Industry Standard Process for Data Mining), which provides a structured framework for data exploration and analysis. This framework consists of six key phases: Business Understanding, Data Understanding, Data Preparation, Modeling, Evaluation, and Deployment. In this context, CRISP-DM serves as a guide to ensure that the data analysis process is conducted in an organized manner.

In the modeling stage, the clustering method is applied. Clustering is an unsupervised learning technique, meaning it can be used on data that does not have predetermined labels or categories. One of the algorithms utilized in clustering is K-Means. This algorithm is known for its low computational

complexity and its ability to handle large volumes of data effectively¹. The superiority of K-Means in handling large data has been proven in previous research (Application of K-Means Clustering and Hierarchical Clustering Algorithms for Data Analysis). K-Means works by dividing data into groups based on similar characteristics so that there is variation between data belonging to one cluster or group² and allows analysis of sales patterns without the need for manual initial grouping.³

Previous research titled “Application of the K-Means Algorithm to Sales Data to Identify the Best-Selling Products at PT Titian Nusantara Boga,” authored by Tri Wahyudi, aimed to classify products based on their popularity using the CRISP-DM method. This study analyzed 793 data points and identifies three clusters: Cluster 1 contained 128 products, Cluster 2 included 622 products, and Cluster 3 has 43 products. A validation test using the Davies-Bouldin Index (DBI), yielding the following results: Cluster 1 scored 0.679, Cluster 2 scored 0.816, and Cluster 3 scored 0.837. Based on these results, Cluster 1 is categorized as “very in demand,” Cluster 2 as “moderately in demand,” and Cluster 3 as “less in demand.” The categorization is determined by the DBI values, where a lower value indicates better cluster quality⁴.

Another study conducted by Narayana Sakti Aji with the title “Determination of Sales of Goods Based on Product Grouping with K-Means Clustering CRISP-DM Method at CV. Sembako Dina” aimed to optimize sales and stock management based on optimal product grouping. In this study using

¹ Ashish Srivastava and Mohammed Nawfal, “Parallelization of the K-Means Algorithm with Applications to Big Data Clustering” (arXiv, May 20, 2024), <https://doi.org/10.48550/arXiv.2405.12052>.

² Achmad Fikri Sallaby et al., “PENGELOMPOKAN BARANG MENGGUNAKAN METODE K-MEANS CLUSTERING BERDASARKAN HASIL PENJUALAN DI TOKO WIDYA BENGKULU,” n.d.

³ Muhammad Rafi Nahjan, Nono Heryana, and Apriade Voutama, “IMPLEMENTASI RAPIDMINER DENGAN METODE CLUSTERING K-MEANS UNTUK ANALISA PENJUALAN PADA TOKO OJ CELL,” *JATI (Jurnal Mahasiswa Teknik Informatika)* 7, no. 1 (January 28, 2023): 101–4, <https://doi.org/10.36040/jati.v7i1.6094>.

⁴ Tri Wahyudi, Naini Sa’adah, and Devi Puspitasari, “Penerapan Metode K-Means Pada Data Penjualan Untuk Mendapatkan Produk Terlaris Di PT. Titian Nusantara Boga” 5, no. 1 (2023).

DBI (Davies Bouldin Index) to determine the number of clusters. From the DBI results there are 5 cluster models tested. 2 clusters have a result of -0.413, 3 clusters have a result of -0.418, 4 clusters have a result of -0.359, 5 clusters - 0.324. From these results, which are close to 0, there are 3 clusters, namely cluster 1 with products that have sales levels in the middle of the best-selling and non-selling products, cluster 2 with fewer products than cluster 1 and even far from cluster 3, cluster 3 with the best-selling products compared to cluster 1 and cluster 2⁵.

In buying and selling activities, the Qur'an is the main source because there are things related to economics and there are also arguments about the permissibility of buying and selling and the prohibition of usury. This is explicitly stated in Q.S. Surah Al-Baqarah verse 275:

الَّذِينَ يَأْكُلُونَ الرِّبَا لَا يَقُومُونَ إِلَّا كَمَا يَقُومُ الَّذِي يَتَخَبَّطُهُ الشَّيْطَانُ مِنَ الْمَسِّ ذَلِكَ بِأَنَّهُمْ قَالُوا إِنَّمَا الْبَيْعُ مِثْلُ الرِّبَا وَأَحَلَّ اللَّهُ الْبَيْعَ وَحَرَّمَ الرِّبَا فَمَنْ جَاءَهُ مَوْعِظَةٌ مِنْ رَبِّهِ فَانْتَهَى فَلَهُ مَا سَفَّ وَأَمْرُهُ إِلَى اللَّهِ وَمَنْ عَادَ فَأُولَئِكَ أَصْحَابُ النَّارِ هُمْ فِيهَا خَالِدُونَ

Meaning: *“Those who eat (take) usury cannot stand but as one who is possessed by a demon because of insanity. That is because they say that buying and selling is the same as usury, whereas Allah has justified buying and selling and forbidden usury. And as for those to whom the prohibition of their Lord has come, and they cease (from usury), then to them belongs what they had taken (before the prohibition came), and their affair is (up to) Allah. But whoever returns (to usury), those are the inhabitants of Hell; they shall abide therein.”*⁶.

The verse above highlights Allah's warning about the negative consequences of engaging in usury. Allah states that those who partake in usury will rise from their graves as if possessed by demons. This is because they equate trade with usury, claiming both are permissible. However, Allah clearly

⁵ Narayana Sakti Aji, Fauzan Natsir, and Siti Istianah, “Penentuan Penjualan Barang Berdasarkan Pengelompokan Produk dengan K-Means Clustering Metode CRISP-DM Pada CV Sembako Dina,” *JOURNAL ZETROEM* 5, no. 2 (October 14, 2023): 119–26, <https://doi.org/10.36526/ztr.v5i2.3041>.

⁶ Burhanuddin Robbani, “Kajian Tentang Konsep Jual Beli Dalam Perspektif Al-Qur’an Dan Hadist,” *Jurnal Ilmiah Ekonomi Islam* 9, no. 2 (July 11, 2023): 2047, <https://doi.org/10.29040/jiei.v9i2.8236>.

the distinction between the two, affirming that buying and selling are lawful while usury is forbidden.

1.2.Problem Formulation

The problem this study addresses is the inaccurate management of stock at the Pekanbaru Jaya Building Store. This inaccuracy makes it difficult to identify the best-selling, most popular, and least-selling products. Inefficient stock management can lead to difficulties in controlling inventory, ultimately hindering the store's ability to optimize product offerings and effectively meet customer demand.

1.3.Problem Restrictions

In preparing this proposal, the author limits the problem or scope of writing to the following matters:

- a. The data utilized in this research is the sales report from Pekanbaru Jaya Building Shop for the years 2022-2023.
- b. This study aims to identify the best-selling, moderately selling, and least selling items based on sales data.
- c. The research was conducted exclusively at Pekanbaru Jaya Building Shop in Riau.
- d. The study employs the K-Means Clustering algorithm for data analysis.

1.4.Research Objectives

The purpose of this study is to analyze and enhance the accuracy of stock management at the Pekanbaru Jaya Building Store. The goal is to identify the best-selling and least-selling items to optimize inventory control and improve sales performance.

1.5.Benefits of Reserach

1. For Author

Help process and develop data in the economic world into information that can help take better business strategies.

1. For Readers

- a.** Serve a research reference in the field of Data Mining and Business Intelligence using the Clustering method with the K-Means algorithm.
- b.** Providing knowledge on business digitalization especially in the field of Data Mining and Business Intelligence.

2. For University

- a.** Proving the ability of students in practicing their knowledge as an evaluation material for students.
- b.** Providing evidence that students can contribute to the business world with modern solutions.

1.6.Systematic Disucussion

This research will use the following writing systematics :

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