

PROFILING RISIKO KREDIT NASABAH BERBASIS K-MEANS CLUSTERING DENGAN OPTIMASI SILHOUETTE COEFFICIENT PADA BANK MALUKUMALUT MASOHI

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ABSTRAK

Risiko kredit merupakan tantangan utama industri perbankan yang memengaruhi stabilitas keuangan. PT Bank Maluku Maluku Cabang Masohi memerlukan pengelolaan risiko terukur untuk meminimalkan kredit bermasalah pada sektor konsumtif. Penelitian ini bertujuan mengelompokkan nasabah berdasarkan profil risiko menggunakan metode *K-Means Clustering*. Penentuan jumlah kluster optimal dievaluasi melalui *Elbow Method*, *Silhouette Coefficient*, dan *Davies-Bouldin Index* (DBI). Variabel penelitian meliputi Total Pokok, *Outstanding* Pokok, Suku Bunga, Tunggakan Pokok, Tunggakan Bunga, Hari Tunggakan, Nilai CKPN, dan Tenor Kredit yang merepresentasikan eksposur serta perilaku pembayaran nasabah. Hasil evaluasi menunjukkan bahwa *Elbow Method* menghasilkan titik pelandaian pada $K = 2$ dengan nilai WCSS 14953,0373. Nilai *Silhouette Score* tertinggi juga dicapai pada $K = 2$ sebesar 0,8090, yang mengindikasikan struktur kluster sangat kuat. Meskipun nilai DBI terendah secara teknis diperoleh pada $K = 3$ sebesar 0,9164, penelitian ini menetapkan $K = 2$ sebagai model akhir. Keputusan ini diambil karena $K = 2$ memiliki kualitas pemisahan kluster yang jauh lebih unggul berdasarkan *Silhouette Score* serta memberikan interpretasi profil risiko yang lebih kontras dan aplikatif bagi manajemen bank. Analisis ini menghasilkan dua kelompok utama: nasabah berisiko rendah dan nasabah berisiko tinggi. Hasil penelitian diharapkan membantu bank dalam pemantauan risiko secara sistematis serta mendukung pengambilan keputusan kredit yang lebih akurat dan terarah.

Kata Kunci: Risiko Kredit, *K-Means Clustering*, *Elbow Method*, *Silhouette Coefficient*, *Davies-Bouldin Index*.

**CUSTOMER CREDIT RISK PROFILING BASED ON K-MEANS CLUSTERING
WITH SILHOUETTE COEFFICIENT OPTIMIZATION AT BANK
MALUKUMALUT MASOHI**

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ABSTRACT

Credit risk is a major challenge in the banking industry, directly impacting financial stability. PT Bank Maluku Malut Masohi Branch requires measurable risk management to minimize non-performing loans in the consumptive credit sector. This study aims to group customers based on credit risk profiles using the K-Means Clustering method. The optimal number of clusters was evaluated using the Elbow Method, Silhouette Coefficient, and Davies-Bouldin Index (DBI). The variables used include Total Principal, Outstanding Principal, Interest Rate, Principal Arrears, Interest Arrears, Days Past Due, Impairment Allowance (CKPN), and Credit Tenor. The evaluation results show that the Elbow Method produced an elbow point at $K = 2$ with a WCSS value of 14953.0373. The highest Silhouette Score was also achieved at $K = 2$ (0.8090), indicating a very strong cluster structure. Although the lowest DBI value was technically obtained at $K = 3$ (0.9164), this study established $K = 2$ as the final model. This decision was made because $K = 2$ demonstrated superior cluster separation quality based on the Silhouette Score and provided a more distinct, applicable risk profile interpretation for bank management. This analysis resulted in two primary groups: low-risk and high-risk customers. This research is expected to assist the bank in systematic risk monitoring and support more accurate credit decision-making.

Keywords: *Credit Risk, K-Means Clustering, Elbow Method, Silhouette Coefficient, Davies-Bouldin Index.*