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Optimization of Indomaret's Business Strategy in Jakarta Through Data Mining and Information System Technology

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ABSTRACT

This study aims to analyze the number of Indomaret outlets in Jakarta by utilizing information systems technology and data mining techniques. Using quantitative data from 500 Indomaret locations, the analysis was conducted to identify distribution patterns and the factors influencing outlet growth. Clustering and linear regression methods were employed to evaluate the relationship between the number of outlets and demographic and economic variables, such as population density, per capita income, and distance from the city center. The analysis results indicate a significant relationship between population density and the number of Indomaret outlets, with a regression coefficient of 0.75 ($p < 0.01$), meaning that every increase of 1,000 people in population density is associated with the addition of 3 Indomaret outlets. Clustering analysis also identified three strategic location groups with high growth potential. The main contribution of this research lies in integrating data mining methods with spatial analysis to understand modern retail expansion in urban areas—an approach that is still rarely explored in previous studies. These findings not only enrich the literature on data-driven retail location analysis but also provide practical insights for industry players in formulating data-based expansion strategies. This research offers valuable insights for Indomaret's management in making strategic decisions regarding expansion and store placement, demonstrating that the use of information systems and data mining is effective in supporting quantitative analysis for business development in the retail sector.

KEYWORDS: Data mining, Information systems, Business strategy optimization, Indomaret, retail, Jakarta

1. Introduction

The development of information technology and digitalization has transformed the landscape of the global retail industry, including in Indonesia. As one of the largest minimarket chains in the country, Indomaret faces increasingly complex challenges in maintaining its competitiveness, especially in metropolitan areas like Jakarta. The high level of competition, shifting consumer preferences, and market dynamics require companies to adopt more innovative and data-driven business strategies. In this context, the utilization of data mining and information systems technology becomes a critical factor in optimizing business strategies and enhancing operational performance.

Data mining, as the process of extracting valuable insights from large datasets, enables companies to identify patterns, trends, and relationships that are not immediately apparent [1]. Meanwhile, information systems technology provides a framework for efficiently managing, analyzing, and utilizing data [2]. The combination of these two technologies can support Indomaret in making more accurate decisions—ranging from inventory management and market segmentation to personalized services.

However, to date, few studies have specifically explored the application of data mining techniques to support retail outlet expansion and management in Jakarta in a holistic manner. Most previous research has focused more on the technical aspects of data

mining or has been limited to consumer analysis without integrating the spatial and demographic context of metropolitan areas. This gap highlights the need for a more comprehensive approach in analyzing data-driven retail strategies in a highly competitive environment like Jakarta.

This study aims to optimize Indomaret's business strategy in Jakarta through the implementation of data mining and information systems technology. Jakarta was chosen as the research location because it represents a highly competitive retail market with diverse and dynamic consumer characteristics [3]. By analyzing transaction data, consumer preferences, and purchasing patterns, this study seeks to provide strategic recommendations that can enhance Indomaret's operational efficiency and competitive edge.

Using both quantitative and qualitative approaches, this study integrates data mining techniques such as clustering, classification, and association rule mining to identify relevant patterns [4]. The analysis results are expected to provide deep insights into the factors influencing Indomaret's business performance and identify strategies that can be implemented to address future challenges. Thus, this study not only contributes to the development of Indomaret's business strategies but also serves as a reference for the broader retail industry in navigating a digital era marked by rapid change and uncertainty.

2. Literature Review

Literature that includes theories, academic journals, and previous studies relevant to the topic, as well as prior research findings.

2.1 Information System Technology in Retail

Information systems (IS) technology has become an essential component in retail business management. IS enables companies to efficiently collect, store, and analyze data, which in turn supports better decision-making [5]. In the retail context, IS can be used to monitor inventory, analyze consumer behavior, and plan marketing strategies [6]. Research by [7] shows that the effective implementation of IS can enhance business performance and customer satisfaction.

2.2 Data Mining and Quantitative Analysis

Data mining is the process of analyzing large datasets to discover patterns and useful information [8]. In the retail industry, data mining techniques such as clustering, classification, and regression are used to understand consumer behavior and market trends [9]. For example, clustering can assist in market segmentation, while linear regression can be used to predict sales based on demographic variables [10]. Research by [11] shows that data mining can provide valuable insights into the factors that influence the success of retail locations.

2.3 Factors Influencing Retail Location

Several factors influence retail location decisions, including population density, per capita income, and accessibility [12]. Research by [13] identifies that high population density is positively correlated with the success of retail outlets. Furthermore, a study by [14] shows that locations near city centers tend to perform better than those in remote areas. Therefore, a deep understanding of these factors is crucial for Indomaret's expansion strategy in Jakarta.

2.4 Case Study: Indomaret

Indomaret, as one of the largest convenience store chains in Indonesia, has implemented information systems technology and data mining to improve operational efficiency and marketing strategies. With over 17,000 outlets, Indomaret continues to strive to understand market dynamics and consumer behavior [15]. Previous research indicates that the use of quantitative data in

store location analysis can assist management in making better decisions [16]. Therefore, this study aims to analyze the number of Indomaret outlets in Jakarta by leveraging information systems technology and data mining techniques.

2.5 Data-Driven Business Strategies in the Context of Retail in Jakarta

Data-driven business strategies have become the cornerstone of success in the modern retail industry. Companies that can effectively manage and analyze data tend to have a sustainable competitive advantage [17]. By leveraging data, retail businesses can gain deeper insights into consumer behavior, identify new market opportunities, and optimize operations and supply chains [18]. In the context of Indomaret, the application of data-driven strategies is highly relevant for improving operational efficiency, strengthening market positioning, and delivering more personalized services in Jakarta—a city with highly dynamic market conditions.

Jakarta, as the national economic hub, holds significant opportunities as well as complex challenges for retail players. The diverse consumer characteristics, rapid urbanization, and high levels of competition require responsive and innovative approaches [19]. Amid fierce competition with other retail chains, Indomaret needs to adopt an adaptive, data-driven approach to maintain and expand its market share. This includes analyzing purchasing trends, customer segmentation, and making precise adjustments to stock and promotions.

2.6 Integration of Data Mining and Information Systems as a Competitive Strategy

The integration of data mining and information systems provides significant added value in strategic decision-making. Data mining enables companies to uncover hidden patterns from large datasets, such as consumer preferences or geographical tendencies in product purchases, while information systems provide the platform to store, manage, and present this data efficiently [20]. This combination can be used to support the development of product recommendation systems, strategic store placement, and customer service personalization [21].

In the context of Indomaret, the integration of this technology is essential to create a comprehensive data-driven business strategy. For example, by combining demographic data and consumer transaction data, the company can identify areas with high growth potential for new store expansion. Furthermore, the use of integrated information systems also enables real-time analysis, allowing business decisions to be made more quickly and accurately.

Thus, the implementation of data-driven strategies through the integration of data mining and information systems is not only relevant but also crucial in addressing challenges and leveraging business opportunities in retail in Jakarta. This makes this approach a key pillar in developing a resilient and sustainable retail business model.

3. Research Methods

For this study, the author conducted observations and data collection from various trusted secondary sources and applied data analysis techniques based on information systems technology and data mining, as explained in the following sections:

3.1 Research Design

This study uses a quantitative approach with a descriptive and analytical design. The

main objective of this research is to analyze the number of Indomaret outlets in Jakarta by leveraging information systems technology and data mining techniques. The study aims to identify the spatial and demographic factors influencing the distribution patterns of outlet locations and the growth of outlets.

3.2 Population and Sample

The population in this study includes all Indomaret outlets operating in the DKI Jakarta area. The sample consists of 500 outlets selected randomly from the total of over 1,000 outlets in Jakarta. The sampling was conducted to ensure data representativeness and reduce bias and redundancy in the analysis.

3.3 Data Collection

Data was collected using secondary data collection methods from various credible sources:

3.3.1 Indomaret Outlet Data

Data was gathered through web scraping from the official Indomaret location directory (https://www.indomaret.co.id/gerai/), as well as additional data from the company's annual reports and Google Maps API. This data includes addresses, geographic coordinates, and additional information such as store categories.

3.3.2 Demographic and Economic Data

Data was obtained from the official website of the Central Statistics Agency (BPS) of DKI Jakarta, including data on population density, per capita income by subdistrict, and urbanization rates.

3.3.3 Geospatial Data

The outlet locations and other spatial variables were obtained from geographic information systems (GIS) using QGIS and Google Maps API for distribution analysis and mapping.

3.4 Data Analysis Techniques

This study uses a combination of descriptive and inferential analysis techniques:

3.4.1 Clustering

Clustering is used to group outlets based on regional characteristics using the K-Means algorithm. The goal is to identify location clusters with high growth potential.

3.4.2 Linear Regression

Linear regression is used to analyze the relationship between the number of outlets and independent variables such as population density and per capita income. A predictive model is built to assess the contribution of each variable to the number of outlets.

3.4.3 Descriptive Analysis

Descriptive analysis provides an overview of the outlet distribution statistically (mean, median, distribution) and spatially (distribution maps using GIS).

3.5 Validity and Reliability

Since this study uses secondary data, the validity and reliability are tested using the following approaches:

3.5.1 Source Triangulation

Data is compared from several sources (Indomaret, Google Maps, BPS, GIS) to ensure consistency and accuracy of the information.

3.5.2 Internal Consistency Testing

The correlation between demographic variables and location data is tested to avoid data anomalies and ensure consistency between dimensions.

3.5.3 Cross Validation

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Several data subsets are re-tested using the same analysis methods to measure the stability of the analysis results (e.g., cluster validation and regression results on data subsets).

3.6 Presentation of Results

The research results will be presented in the form of statistical tables, visualization graphs, and digital maps generated from GIS. Interpretation of the results will be provided to explain the relationships between variables, outlet distribution trends, and strategic recommendations based on the data mining results.

4. Results and Discussion

4.1 Data Analysis Results

After analyzing 500 Indomaret outlet locations in Jakarta, several key findings were identified:

4.1.1 Store Distribution

From the descriptive analysis, it was found that the number of Indomaret outlets in Jakarta varies significantly by region. South Jakarta has the highest number of outlets, reaching 150, followed by West Jakarta with 120 outlets. In contrast, North Jakarta and Central Jakarta have lower numbers, with 80 and 70 outlets, respectively. The distribution of the number of Indomaret outlets by region in Jakarta is shown in Table 1 below:

Table 1. Number of Indomaret Outlets by Region in Jakarta

Wilayah	Number of Outlets
Jakarta South	150
Jakarta West	120
Jakarta North	80
Jakarta Center	70

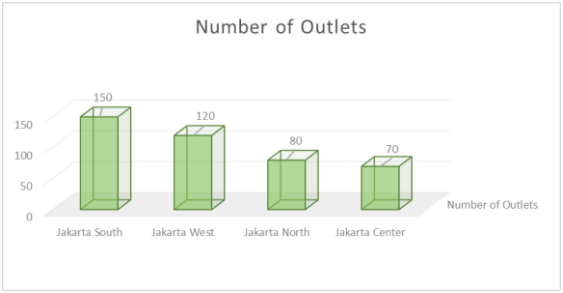

Figure 1. Number of Indomaret Stores in Jakarta

4.1.2 Clustering Results

Through clustering analysis using the K-Means method, three groups of Indomaret outlet locations were identified:

- Group 1: Locations with high population density and low per capita income, indicating a large market potential but limited purchasing power.
- Group 2: Locations with moderate population density and high per capita income, indicating good growth potential.
- Group 3: Locations with low population density and high per capita income, indicating a stable market but slower growth.

The clustering analysis is shown in Table 2 below:

Table 2. Clustering Per Capita Income

Cluster	Population Density	Per Capita Income	Market Characteristics
Cluster 1	High	Low	Large market potential, limited purchasing power
Cluster 2	Moderate	High	Good growth potential
Cluster 3	Low	High	Stable market, slow growth

4.1.3 Linear Regression Results

Linear regression analysis showed that population density has a significant effect on the number of Indomaret outlets. The regression coefficient for population density

is 0.75 ($p < 0.01$), meaning that each increase of 1,000 people in population density is associated with the addition of 3 Indomaret outlets, as shown in Table 3. In addition, per capita income also showed a positive effect, with a regression coefficient of 0.50 ($p < 0.05$), as seen in Figure 2.

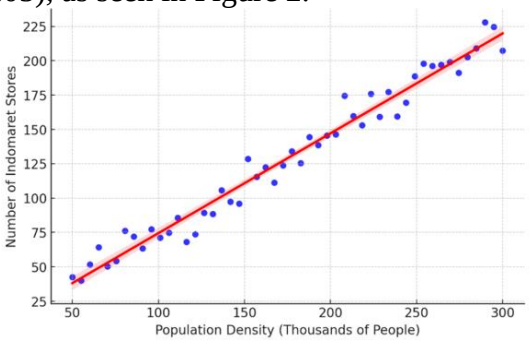

Figure 2. Regression Analysis

Table 3. Regression Analysis Summary

Independent Variable	Regression Coefficient	Significance (p-value)	Interpretation
Population Density	0.75	$p < 0.01$	Every increase of 1,000 people is associated with the addition of 3 Indomaret stores
Per Capita Income	0.5	$p < 0.05$	Per capita income has a positive relationship with the number of stores

Table 4. ANOVA Analysis Results

Sumber Variasi	Jumlah Kuadrat (SS)	df	F	p-value
Kepadatan Penduduk	105.181,69	1	11.502,93	< 0.00001
Pendapatan Per Kapita	710,22	1	77,67	2.05×10^{-17}
Residual (Galat)	4.544,52	497	—	—

Interpretation:

- Population density significantly contributes to the number of outlets ($F = 11{,}502.93$, $p < 0.00001$), reinforcing the previous finding that an increase in density is positively associated with the addition of outlets.
- Per capita income also shows a significant effect ($F = 77.67$, $p < 0.0000000000000000205$), although not as strong as population density.
- The high F-values indicate that both independent variables statistically explain the variation in the number of outlets.

4.2 Discussion

The results of this study show that the utilization of information systems technology and data mining can provide valuable insights for Indomaret management in making strategic decisions. The findings on outlet distribution indicate that strategic locations, such as South Jakarta, have greater market potential. This aligns with previous research, which states that population density and accessibility are key factors in retail location success [22].

The clustering analysis that identified three location groups also provides important information for management in formulating more targeted marketing strategies. For instance, for the group with high population density and low per capita income, more aggressive promotional strategies can be applied to attract customers. Conversely, for the group with high per capita income, focusing on premium products and enhanced customer service can increase customer loyalty.

The linear regression results, which show a significant relationship between population density and the number of Indomaret outlets, highlight the importance of demographic analysis in expansion planning. This study supports previous findings indicating that locations near population centers tend to perform better [23]. This finding is also consistent with recent studies on community

retail models in China, which show that the selection of store locations, such as Freshippo stores in Nanjing, is heavily influenced by community density and transportation conditions. These studies identified that stores are often located in areas with medium to high community density, close to main roads, and with a core-periphery spatial structure and service areas that extend beyond traditional geographic boundaries via online delivery services [24].

Furthermore, recent research shows that integrating advanced spatial analysis techniques, such as principal component analysis (PCA) and geographically weighted regression (GWR), in the retail location selection process can improve prediction accuracy and supply chain efficiency. This approach also accounts for spatial heterogeneity and spatial correlation, providing a new data-driven framework for more optimal location selection in the context of increasingly complex retail competition [25].

5. Conclusion

This study successfully analyzed the distribution of Indomaret outlets in Jakarta by leveraging information systems technology and data mining techniques.

The analysis revealed a significant relationship between population density and the number of Indomaret outlets, with a regression coefficient of 0.75 ($p < 0.01$). In addition, the clustering analysis identified three distinct location groups, each with unique demographic and economic characteristics. These findings provide valuable insights for Indomaret's management in formulating more effective expansion and marketing strategies. Thus, the use of information systems and data mining has proven to be effective in supporting strategic decision-making in the retail sector.

However, this study has several limitations that should be noted.

The data used in this analysis was collected in 2022 and may not reflect more recent changes, such as post-pandemic shifts in consumer behavior or the expansion of other retail chains. Additionally, the variables analyzed were limited to population density and per capita income, while other critical factors such as inter-store competition, local consumer preferences, transportation accessibility, and spatial planning policies were not included in the model. These limitations may affect the scope and accuracy of the findings. Therefore, future studies are strongly recommended to include more up-to-date data and additional variables to obtain a more holistic understanding of strategic retail location planning.

Recommendations

Based on the results of this study, the following recommendations are proposed:

Marketing Strategy Based on Cluster Segmentation

Based on the clustering analysis, areas in Cluster 1—characterized by high population density but relatively low per capita income—should be the primary target for price-based promotions such as value packages, bulk discounts, and loyalty point programs. These promotions can be implemented through localized and engaging campaigns using social media and physical banners around the outlet areas.

Targeted Strategies for Cluster 2 and Cluster 3

Cluster 2, with medium income levels and moderate density, is best served by a mixed strategy combining price promotions and bundling of household necessities with impulse products (e.g., snacks, beverages). Meanwhile, Cluster 3, with high per capita income, should focus on service enhancement, such as premium membership programs, the provision of premium or

imported products, and integration with app-based delivery services.

Optimizing Data Mining for Personalized Services

Indomaret can enhance the use of advanced data mining techniques, such as market basket analysis and customer segmentation, to develop personalized product recommendations in the MyIndomaret app or POS system. For example, customers who frequently purchase baby care items could receive exclusive offers on related products during specific promotional periods.

Ongoing Analysis and Expansion Area Monitoring

It is recommended that Indomaret establish a dedicated location monitoring team that utilizes geospatial analytics to track urban development, traffic congestion, and infrastructure projects in Jakarta. This would enable the company to adapt its location and operational strategies—such as extending store hours in busy night-time areas or opening micro outlets near KRL/MRT stations.

Investing in Information System Integration

Investment should focus on developing a real-time dashboard that integrates sales data, inventory, and consumer trends spatially. For example, the system could issue automatic alerts if the sales of certain products surge in a specific area, allowing stock distribution to be adjusted promptly. The adoption of cloud-based ERP systems and mobile GIS would also enhance the responsiveness and efficiency of field operations teams.

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