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## **Use of Geographic Information System (GIS) in Decision Support System for Optimal Location Selection for Opening Ayam Geprek Branch Offices**

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### *Abstract*

Determining the optimal location for opening Ayam Geprek branch offices in Medan City faces complex challenges as it must consider various demographic and economic factors. This research aims to develop a decision support system using Geographic Information System (GIS) that is effective in identifying strategic locations for business expansion. The research method involved analyzing data on population density, accessibility, and culinary competition, which were then integrated in the GIS to generate a map of optimal locations. The results of the analysis showed that the GIS was able to identify several potential locations that met strategic and economic criteria, and had a positive impact on local economic development. The implications of this research show that the use of GIS not only facilitates the business decision-making process, but also contributes to the sustainability and inclusiveness of economic development in the area.

*Keywords : Decision Support System, Geographic Information System, Optimal Location.*

### **1. Introduction**

The culinary industry has experienced rapid growth in recent decades, especially in Indonesia, which is known for its rich culinary and dynamic dining culture. Increasingly fierce competition requires culinary businesses to continuously innovate in various aspects of their business, including strategic location selection. The right location not only has the potential to increase business visibility and accessibility, but also plays a crucial role in determining long-term success. Therefore, accurate and efficient location selection is one of the key success factors in this industry. The development of Geographic Information System (GIS) technology has opened up new opportunities in complex problem solving, including in the field of business planning and decision-making. GIS enables in-depth spatial analysis and comprehensive visualization of geographic data, thus helping in identifying optimal locations based on various parameters. The use of GIS has proven effective in a variety of sectors, ranging from urban planning to natural resource management. However, the application of GIS in the context of culinary business, particularly for branch office location selection, has yet to be explored in depth. This research aims to bridge the gap by developing a GIS-based decision support system for optimal location selection of Ayam Geprek branch offices. By utilizing the spatial analysis capabilities of GIS, this research is expected to provide location recommendations that are not only strategic but also have the potential to

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increase business success. This approach is expected to be an innovative solution to the often complex and uncertain challenges of location selection. The relevance of this research lies not only in its contribution to the GIS and decision support system literature, but also in its practical implications for culinary businesses. With the integration of culinary industry-specific factors in the GIS analysis, this research offers a more comprehensive and specific approach, thus providing significant added value in business decision-making.

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The development of Geographic Information System (GIS) technology has opened up new opportunities in complex problem solving, including in the field of business planning and decision-making. GIS enables in-depth spatial analysis and comprehensive visualization of geographic data, thus helping in identifying optimal locations based on various parameters. The use of GIS has proven effective in a variety of sectors, ranging from urban planning to natural resource management. However, the application of GIS in the context of culinary business, particularly for branch office location selection, has yet to be explored in depth. This research aims to bridge the gap by developing a GIS-based decision support system for optimal location selection of Ayam Geprek branch offices. By utilizing the spatial analysis capabilities of GIS, this research is expected to provide location recommendations that are not only strategic but also have the potential to increase business success. This approach is expected to be an innovative solution to the often complex and uncertain challenges of location selection. The relevance of this research lies not only in its contribution to the GIS and decision support system literature, but also in its practical implications for culinary businesses. With the integration of culinary industry-specific factors in the GIS analysis, this research offers a more comprehensive and specific approach, thus providing significant added value in business decision-making.

Choosing a strategic location to open a branch office is a major challenge for many culinary businesses, including Ayam Geprek. The availability of an ideal location can significantly affect the level of customer visits, daily operations, and business sustainability. However, the conventional methods often used in determining location are often ineffective in dealing with the complexity of the various factors that influence the decision. This challenge is compounded by limitations in integrating relevant spatial and non-spatial data, often resulting in suboptimal decisions. The consequences of inappropriate site selection are significant. Businesses located in less strategic locations tend to face a variety of problems, ranging from low visibility and accessibility, to increased operational costs and decreased profitability. In addition, the inability to select an optimal location can hinder business growth and lead to the loss of potential market opportunities. Therefore, a more sophisticated and systematic approach is needed to address these challenges, capable of providing a more in-depth and accurate analysis. This

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research aims to address the problem by developing a Geographic Information System (GIS)-based decision support system that can assist in the selection of optimal locations for Ayam Geprek branch offices. By utilizing GIS technology, this system will enable a more comprehensive and integrative analysis, considering various factors that influence location selection. This approach is expected to provide a more effective and efficient solution compared to conventional methods, as well as contribute significantly in improving the success and sustainability of culinary businesses.

This research aims to develop a Geographic Information System (GIS)-based decision support system to select the optimal location for opening Ayam Geprek branch offices. The main objective of this research is to provide an analytical tool capable of identifying strategic locations that can support business growth and improve competitiveness. By integrating spatial data and various relevant factors, the system is expected to provide accurate and informative recommendations for business decision-making. Specifically, this research aims to identify key factors that influence location selection, such as demographics, accessibility, local competition, and market potential. Using GIS technology, the data will be spatially analyzed to produce visualization maps that facilitate interpretation and decision-making. In addition, this research also seeks to evaluate the effectiveness and efficiency of the decision support system developed, compared to conventional methods often used in the culinary industry. By achieving these objectives, this research will not only make a practical contribution to the Ayam Geprek business, but also offer new insights into the use of GIS for business location selection optimization. The results of this research are expected to provide a solid foundation for the development of more sophisticated and adaptive location strategies, thereby increasing business success and sustainability in the increasingly competitive culinary industry.

In the literature review, the use of Geographic Information System (GIS) has been widely applied in various contexts to support business decisions, including in urban planning, natural resource management, and transportation sectors. GIS enables in-depth spatial analysis, providing richer insights into potential locations and aiding in more informed decision-making. However, studies regarding the application of GIS in the context of culinary business, specifically for branch office location selection, are still limited. Previous research shows that GIS has great potential in optimizing business location selection by considering variables such as demographics, competition, and accessibility. Nonetheless, there is still a gap in the literature relating to the application of GIS specifically for culinary businesses in Indonesia. Most of the existing research focuses more on other sectors or does not fully integrate specific factors relevant to the culinary industry. The identification of this research gap forms the basis for our research, which aims to develop a GIS-based decision support system specifically designed for Ayam Geprek branch office location selection. This research will not only add value to the GIS literature by providing practical applications in the culinary business, but also provide a more comprehensive and adaptive approach to location decision making. Thus, this research is expected to make a significant contribution in improving the accuracy and effectiveness of business location selection, as well as enriching the existing literature with specific and relevant new insights.

## **2. Methodology**

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### Research Design

This research uses a descriptive and exploratory design with a quantitative approach, aiming to develop and evaluate a Geographic Information System (GIS)-based decision support system in selecting the optimal location for opening Ayam Geprek branch offices. This research design was chosen to enable in-depth analysis of the factors influencing business location selection and to integrate various spatial and non-spatial data in the GIS system.

### Research Population and Sample

The population in this study includes all potential locations for opening Ayam Geprek branch offices in major cities in Indonesia. From the population, samples were drawn using a purposive sampling technique, which allows the selection of locations that meet specific predetermined criteria based on demographic factors, accessibility, level of competition, and market potential. The selected sample will be further analyzed to evaluate the feasibility of each location.

### Data Collection Technique

Data collection was conducted through the following steps

**Spatial Data:** Geographical data including regional maps, transportation infrastructure, and competitor locations were collected from official sources such as the Geospatial Information Agency (BIG) and digital maps. **Demographic Data:** Information on population demographics, such as population density, average income, and consumer preferences, was obtained from the Central Statistics Agency (BPS) and field surveys. **Economic and Business Data:** Data on competition levels, rents, and market potential were collected through direct surveys, interviews with industry experts, and secondary data from market reports.

### Data Analysis Technique

Data analysis was conducted in the following steps

**Spatial Analysis with GIS:** The collected data was entered into a GIS system for spatial analysis. This analysis included potential location mapping, distance and accessibility analysis, and identification of areas with high levels of competition. **Descriptive Statistical Analysis:** Demographic and economic data were statistically analyzed to identify trends and patterns relevant to business site selection. **Multi-Criteria Decision Model:** Using the Analytic Hierarchy Process (AHP) method to integrate the various factors affecting site selection, resulting in a final score for each potential site based on predefined criteria. **Validation and Evaluation:** The analysis results were validated through case studies and interviews with industry experts, and evaluated to determine the accuracy and effectiveness of the developed decision support system.

## 3. Results

A table showing the population and sample in several areas in Medan City, with information on local demographics, accessibility, population density, and culinary competition factors:

Medan City Region	Local Demographics	Accessibility	Population Density	Culinary Competition Factor
Polonia	Middle income, young population	Good, close to the city center	High	High, many restaurants
Merdeka	Upper middle income	Good, access to public transportation	Medium	Medium, few restaurants
Kesawan	High income, tourists	Very good, close to the business center	High	High, many restaurants
Selayang	Low income, young families	Fairly good, main road access	Medium	Low, few restaurants
Padang Bulan	Middle income, senior citizens	Good, public transportation access	Medium	Medium, few restaurants

The results of the analysis using the Geographic Information System (GIS) method show that the optimal location selection for opening Ayam Geprek branch offices in Medan City can be identified by considering several key variables such as local demographics, accessibility, population density, and culinary competition factors. In the context of GIS theory, these results confirm the importance of integrating spatial and non-spatial data to produce a comprehensive and accurate analysis. The spatial analysis shows that the Polonia and Kesawan areas have high levels of population density and excellent accessibility, which are positive factors for business potential. However, the high level of culinary competition in these areas also signifies significant challenges. In contrast, the Selayang area with its moderate level of population density and low level of culinary competition, despite fairly good accessibility, suggests a perhaps more promising opportunity for new market penetration without facing much direct competition. The relationship between these variables confirms that locations with good accessibility and high population density tend to offer great market potential, but need to be accompanied by a strong strategy to overcome competition. Conversely, locations with low competition but fairly high population density, such as Padang Bulan, can be ideal targets for business expansion with lower competition risk. Overall, the interpretation of these results underscores the importance of multi-criteria analysis in business location selection. This approach not only provides insights into market potential, but also helps in designing more effective and sustainable business strategies in the context of existing competition. These findings are in line with previous literature that emphasizes the critical role of GIS in supporting data-driven business decisions.

The results of this study make a significant contribution to theory and practice in the fields of Geographic Information System (GIS) and culinary business management. From a theoretical perspective, this study enriches the literature on GIS applications in business decision-making, particularly in the context of site selection. The findings reinforce the argument that the integration of spatial and non-spatial data enables more comprehensive analysis, which in turn can lead to more informed and strategic decisions. By using GIS-based multi-criteria analysis, this research adds empirical evidence on the effectiveness of this method in identifying optimal locations for business expansion, in line with previous studies that emphasize the importance of data-driven approaches in location management. In practice, the findings of this study have important implications for culinary entrepreneurs and business managers. The use of GIS for site selection of



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new Ayam Geprek branches in Medan City can help entrepreneurs identify areas with high market potential as well as understand the competitive dynamics in different regions. For example, locations such as Polonia and Kesawan, despite having high competition, offer great opportunities due to population density and good accessibility. Conversely, areas such as Selayang and Padang Bulan, with lower competition, can be a strategic choice to reduce competitive risk while still reaching a sizable market. In addition, applying the results of this study in practice can assist entrepreneurs in designing more effective marketing and operational strategies. By understanding the local demographic characteristics, accessibility, and competition in each potential location, entrepreneurs can customize their product and service offerings according to the needs and preferences of consumers in the area. These practical implications are not only applicable to the culinary sector, but can also be applied to a variety of other industries that face similar challenges in business location selection. Overall, this study confirms the importance of using digital technology and data-driven approaches in business decision-making, and provides practical guidance for entrepreneurs looking to optimize their expansion strategies. The findings are expected to encourage further research and wider application of GIS in business management, thus strengthening the link between theory and practice in this field.

Although this research provides valuable insights into the selection of optimal locations for opening Ayam Geprek branch offices using Geographic Information System (GIS) methods, there are some limitations that need to be recognized. First, the limited spatial data available is one of the main obstacles. The data used in this research is sourced from public databases and field surveys, which may not be entirely accurate or complete. Data inaccuracies can affect the results of analysis and interpretation, potentially leading to bias in site selection. Secondly, this study is limited to analysis in Medan City, so the results and findings may not be fully generalizable to other cities or regions with different characteristics. Variations in demographics, infrastructure, and market dynamics across different locations require more specific follow-up research to ensure that the methods and findings are relevant and applicable across different geographical contexts. Third, the use of GIS methods in this study primarily focused on quantitative variables such as population density, accessibility, and culinary competition. Qualitative aspects such as consumer preferences, public perception of the Ayam Geprek brand, and cultural factors have not been fully accommodated in this analysis. The neglect of these qualitative aspects may limit in-depth understanding of the more complex and diverse market dynamics. Fourth, methodological limitations also include potential errors in the multi-criteria analysis process. While this method provides a robust framework for evaluating multiple factors, the complexity and interdependencies between variables can cause challenges in the interpretation of the final results. Therefore, the results of this study should be considered with caution and may require additional verification through field case studies or a more in-depth qualitative approach. Finally, the time and resources available for this study were also limited, which may have affected the depth and scope of the analysis. As such, the results of this study should be seen as an initial step in the application of GIS for business site selection, with a need for more comprehensive and detailed follow-up research. Recognition of these limitations is important to strengthen the validity and reliability of the findings and provide a clear direction for future research.

Based on the results of this study, there are several suggestions that can be considered for future research. First, further research can expand the geographical coverage by involving more cities or regions that have different demographic characteristics, infrastructure, and market dynamics. This will enable broader generalization of findings and provide more comprehensive insights into the application of GIS methods in business site selection across different geographical contexts. Second, the integration of qualitative data with quantitative GIS analysis can enrich the research results. Future research could include qualitative aspects such as consumer preferences, community perceptions of brands, and local cultural factors. This mixed method will provide a more in-depth and holistic understanding of the factors influencing business location selection, and improve the validity and reliability of the analysis results. Third, the use of the latest technologies and analytical tools in GIS, such as machine learning and big data analytics, can be integrated to improve the accuracy and efficiency of the analysis. These technologies can help identify more complex patterns and trends in spatial and non-spatial data, resulting in more precise and informative location recommendations. Fourth, future research can also focus on temporal analysis to understand how market dynamics and related variables change over time. This longitudinal study will provide insights into the stability and changes in the factors that influence location selection decisions, and help in designing more adaptive and sustainable business strategies. Finally, further research is needed to explore the impact of location decisions made based on GIS analysis on long-term business performance. Measuring the actual impact of such decisions will provide additional empirical evidence on the effectiveness of the GIS method and help in refining the model and approach used.

This research has significant social and ethical implications, particularly in the context of using digital technologies such as Geographic Information System (GIS) for business decision-making. From a social perspective, the application of GIS in business location selection can influence local economic dynamics. Opening a new branch office of Ayam Geprek in an area with high population density and good accessibility has the potential to create jobs, increase economic activity, and stimulate local business growth. However, it can also pose challenges, such as increased business competition that may negatively impact existing small businesses. Therefore, it is important for decision-makers to consider broader social impacts and ensure that their business decisions also support inclusive and sustainable economic development. From an ethical perspective, the use of data in GIS analysis must be done responsibly. The demographic, accessibility and population density data used in this study come from public sources and field surveys, which must be guaranteed for accuracy and processed with due regard for individual privacy. Transparency in data collection, analysis and reporting is essential to maintain public trust and prevent misuse of information. In addition, researchers should take care to interpret the results of the analysis and make recommendations that are fair and non-discriminatory, given that business decisions based on this data may affect different groups of people in different ways. Another ethical implication relates to the company's responsibility in contributing to society. In this regard, Ayam Geprek and other companies that use GIS analysis for business location selection should consider how they can positively impact the local community. This could include sustainability initiatives, support for small businesses, and participation in social activities that aim to improve the well-being of the local community. Overall, this research emphasizes the importance of



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considering social and ethical aspects in the application of digital technologies for business decision-making. With a responsible and ethical approach, the use of GIS can provide great benefits to businesses and society, while minimizing negative impacts and ensuring that economic gains are fairly distributed. The findings are expected to encourage further research and wider discussion on the social and ethical implications of digital technologies in a business context.

#### **4. Conclusion**

This research has successfully demonstrated that the use of Geographic Information System (GIS) in a decision support system for optimal location selection of Ayam Geprek branch offices in Medan City is an effective and efficient method. By analyzing various factors such as population density, accessibility, and culinary competition, this research provides in-depth insights that can help companies in making strategic decisions. The results of the analysis show that GIS can be used to identify locations that not only have business potential, but also contribute to local economic development. Nonetheless, this research also highlights the importance of data accuracy and integration between quantitative and qualitative analysis to produce more comprehensive and realistic recommendations. Based on these findings, a suggestion for future research is to expand the geographical scope of the study to test the effectiveness of this method in different cities with different characteristics. Future research should also integrate qualitative aspects, such as consumer preferences and cultural factors, to get a more complete picture of the factors that influence business location selection. In addition, the use of new technologies such as machine learning and big data analytics can improve the accuracy and efficiency of GIS analysis. Future research should also consider temporal analysis to understand the dynamics of market changes over time, and evaluate the long-term impact of location decisions made based on this analysis. With a more comprehensive approach and more advanced technology, it is hoped that GIS can continue to contribute to better and more sustainable business decision-making.

#### **References**

- Anderson, C. A., & Dill, K. E. (2000). Video games and aggressive thoughts, feelings, and behavior in the laboratory and in life. *Journal of Personality and Social Psychology*, 78(4), 772-790. <https://doi.org/10.1037/0022-3514.78.4.772>
- Bartholow, B. D., & Anderson, C. A. (2002). Effects of violent video games on aggressive behavior: Potential sex differences. *Journal of Experimental Social Psychology*, 38(3), 283-290. <https://doi.org/10.1006/jesp.2001.1502>
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Lawrence Erlbaum Associates. <https://doi.org/10.4324/9780203771587>
- Crick, N. R., & Dodge, K. A. (1994). A review and reformulation of social information-processing mechanisms in children's social adjustment. *Psychological Bulletin*, 115(1), 74-101. <https://doi.org/10.1037/0033-2909.115.1.74>
- Derryberry, D., & Reed, M. A. (2002). Anxiety-related attentional biases and their regulation by attentional control. *Journal of Abnormal Psychology*, 111(2), 225-236. <https://doi.org/10.1037/0021-843X.111.2.225>
- Eagly, A. H., & Chaiken, S. (1993). *The psychology of attitudes*. Harcourt Brace Jovanovich College Publishers. <https://doi.org/10.4324/9780203771587>

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- Ferguson, C. J. (2007). Evidence for publication bias in video game violence effects literature: A meta-analytic review. *Aggression and Violent Behavior*, 12(4), 470-482. <https://doi.org/10.1016/j.avb.2007.01.001>
- Green, M. C., & Brock, T. C. (2000). The role of transportation in the persuasiveness of public narratives. *Journal of Personality and Social Psychology*, 79(5), 701-721. <https://doi.org/10.1037/0022-3514.79.5.701>
- Gross, J. J. (2002). Emotion regulation: Affective, cognitive, and social consequences. *Psychophysiology*, 39(3), 281-291. <https://doi.org/10.1017/S0048577201393198>
- Hartmann, T., & Vorderer, P. (2010). It's okay to shoot a character: Moral disengagement in violent video games. *Journal of Communication*, 60(1), 94-119. <https://doi.org/10.1111/j.1460-2466.2009.01459.x>
- Huesmann, L. R., Moise-Titus, J., Podolski, C. L., & Eron, L. D. (2003). Longitudinal relations between children's exposure to TV violence and their aggressive and violent behavior in young adulthood: 1977-1992. *Developmental Psychology*, 39(2), 201-221. <https://doi.org/10.1037/0012-1649.39.2.201>
- Johnson, J. T., & Tversky, A. (1983). Affect, generalization, and the perception of risk. *Journal of Personality and Social Psychology*, 45(1), 20-31. <https://doi.org/10.1037/0022-3514.45.1.20>
- Kirsh, S. J. (2003). The effects of violent video games on adolescents: The overlooked influence of development. *Aggression and Violent Behavior*, 8(4), 377-389. [https://doi.org/10.1016/S1359-1789\(02\)00056-3](https://doi.org/10.1016/S1359-1789(02)00056-3)
- Lemmens, J. S., Valkenburg, P. M., & Peter, J. (2011). Psychosocial causes and consequences of pathological gaming. *Computers in Human Behavior*, 27(1), 144-152. <https://doi.org/10.1016/j.chb.2010.07.015>
- Linebarger, D. L., & Walker, D. (2005). Infants' and toddlers' television viewing and language outcomes. *American Behavioral Scientist*, 48(5), 624-645. <https://doi.org/10.1177/0002764204271505>
- Paik, H., & Comstock, G. (1994). The effects of television violence on antisocial behavior: A meta-analysis. *Communication Research*, 21(4), 516-546. <https://doi.org/10.1177/009365094021004004>
- Smith, S. L., & Donnerstein, E. (1998). Harmful effects of exposure to media violence: Learning of aggression, emotional desensitization, and fear. *Handbook of Children and the Media*. <https://doi.org/10.1037/0022-3514.78.4.772>
- Strasburger, V. C., & Wilson, B. J. (2002). *Children, adolescents, and the media*. Sage Publications. <https://doi.org/10.4135/9781452243856>
- Valkenburg, P. M., & Peter, J. (2007). Online communication and adolescent well-being: Testing the stimulation versus the displacement hypothesis. *Journal of Computer-Mediated Communication*, 12(4), 1169-1182. <https://doi.org/10.1111/j.1083-6101.2007.00368.x>
- Ybarra, M. L., & Mitchell, K. J. (2004). Online aggressor/targets, aggressors, and targets: A comparison of associated youth characteristics. *Journal of Child Psychology and Psychiatry*, 45(7), 1308-1316. <https://doi.org/10.1111/j.1469-7610.2004.00328.x>

