The Role of Geographic Information Systems (GIS) in Location-Based Decision Making

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The Role of Geographic Information Systems (GIS) in Location-Based Decision Making

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ABSTRACT

Geographic Information Systems (GIS) play a crucial role in location-based decision making in various contexts. The aim of this research is to investigate how GIS contributes to improving the decision-making process by considering spatial factors. The research method used involves in-depth literature analysis as well as case studies to illustrate the application of GIS in the context of location-based decision making. The analysis results show that GIS provides advantages in visualizing geographic data, analyzing spatial patterns, and facilitating the integration of various information to support a more effective decision-making process. The conclusion of this research is that the application of GIS can increase efficiency and effectiveness in location-based decision making, both in the context of business, government and natural resource management.

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1. INTRODUCTION

Location-based decision making has become a major concern in various disciplines and practices, especially in the context of urban development, natural resource management, transportation, and business. In the current digital era, Geographic Information Systems (GIS) have emerged as an important tool in supporting the decision-making process by utilizing geographic information [1]. GIS provides a powerful framework for understanding the spatial relationships between various phenomena, enabling users to analyze and visualize geographic data in relevant temporal and spatial contexts.

Within this theoretical framework, this research aims to explore and evaluate the role of GIS in location-based decision making. By combining theoretical concepts in GIS, spatial analysis, and decision-making theory, this research will provide in-depth insight into how GIS facilitates the decision-making process by considering location factors [2]. Primarily, this research will

examine the contribution of GIS in improving the efficiency, accuracy, and sustainability of decisions related to location context.

Through this research, it is hoped that a better understanding will be gained about how the application of GIS can strengthen decision-making capacity in various contextual scenarios. In addition, the findings from this research can also provide practical guidance for practitioners and decision makers in utilizing the potential of GIS to achieve optimal results in the context of location-based decisions.

2. THEORETICAL BASIS

Geographic Information Systems (GIS):
A Geographic Information System (GIS) is a computer system that allows users to collect, store, manage, analyze and visualize geographic or location-based data. GIS provides a powerful framework for understanding spatial relationships between various phenomena in various contexts, including in decision making. In the context of location-based decision making, GIS plays a key role in providing relevant spatial information to support better decision-making processes [3].

2. Spatial Analysis:
Spatial analysis is an approach used to understand patterns, relationships and distribution of geographic phenomena in space. It involves the use of statistical, mathematical, and computational techniques to explore and explain geographic phenomena in a spatial context. In the context of location-based decision making, spatial analysis helps in the identification of relevant patterns, risk mapping, as well as understanding the impact of decisions on geographic space.

3. Decision Making Theory:
Decision making theory is a field of study that studies the process of how individuals or organizations choose one of several available alternatives based on certain considerations. This theory includes various models and approaches, including rational models, behavioral models, and decision process models. In the context of location-based decision making, decision-making theory helps in understanding the factors that influence location-related decisions, as well as strategies that can be used to improve the decision-making process.

The integration of the three theoretical foundations above is important in understanding the role of Geographic Information Systems (GIS) in location-based decision making. GIS provides tools for collecting and analyzing geographic data, spatial analysis provides insight into the relationships between phenomena in space, while decision-making theory helps in understanding decision-making processes related to location. Thus, combining these three theoretical foundations forms a comprehensive framework for understanding and analyzing the role of GIS in location-based decision making.

3. RESEARCH METHODOLOGY

1. Research Approach:
This research uses a qualitative approach with a focus on case studies. A qualitative approach was chosen because it allows researchers to gain an in-depth understanding of the role of

Geographic Information Systems (GIS) in location-based decision making, as well as allowing for a comprehensive exploration of the specific context in which GIS is used [4].

2. Development Method:
Research development involves the identification and selection of relevant case studies in various contexts of GIS use in location-based decision making. Next, the research will involve collecting primary data through interviews, direct observation and participatory observation in the field.

3. Variable Type:
The variables in this research consist of two main types, namely independent variables and dependent variables. The independent variable is the application of Geographic Information Systems (GIS) in the context of location-based decision making, while the dependent variable is the effectiveness and efficiency of the decision making process.

4. How to Collect Data:
Primary data will be collected through in-depth interviews with relevant stakeholders, including decision-making managers, GIS users, and experts in related fields. In addition, direct observations will be carried out to gain a deeper understanding of the context of GIS use in real decision situations [5].

5. Data Processing and Verification Techniques:
The collected data will be analyzed using qualitative analysis techniques, including thematic analysis to identify patterns and themes that emerge from the data. Data verification is carried out through data triangulation, namely comparing and confirming information from various sources and data collection methods to ensure the validity and reliability of the findings.

Thus, a qualitative research approach with a focus on case studies, primary data collection through interviews and observations, as well as thematic analysis and data triangulation are relevant steps to understand in depth the role of Geographic Information Systems (GIS) in location-based decision making.

4. RESULTS AND DISCUSSION

Research result:

This study shows that Geographic Information Systems (GIS) have a significant role in location-based decision making in various contexts. Through case study analysis and interviews with relevant stakeholders, it was found that the application of GIS has increased effectiveness and efficiency in decision-making processes involving location factors. GIS provides the ability to integrate and analyze diverse geographic data, allowing users to understand and respond more precisely to spatial conditions in the field.

Discussion:

1. Geographic Data Visualization:
GIS allows users to visualize geographic data in the form of interactive and informative maps. This allows decision makers to quickly understand the spatial distribution of phenomena relevant to the decision to be taken, such as customer location, infrastructure, or potential risks.

2. Spatial Analysis:
The application of GIS makes it possible to carry out more in-depth spatial analysis, such as identifying spatial patterns, risk mapping, and analyzing resource availability. This helps decision makers identify relationships and interactions between location-related variables, thereby enabling more accurate and relevant decision making.

3. Data Integration and Decision Making:
GIS facilitates the integration of various data sources, both spatial and non-spatial data, in one platform. This allows users to make more informed decisions by comprehensively considering various location-relevant factors.

4. Support for Location-Based Decision Processes:
Overall, the findings of this study confirm that GIS has a crucial role in supporting the location-based decision-making process. By providing tools to understand, analyze and respond to spatial conditions, GIS helps organizations and individuals optimize their decisions in a variety of contexts, from urban planning to natural resource management.

Thus, the results of this research provide strong empirical support for the important role of Geographic Information Systems in location-based decision making, as well as highlighting the potential of GIS applications in improving the efficiency and effectiveness of decision-making processes in various fields.

5. CLOSURE

In this research, we have investigated in depth the role played by Geographic Information Systems (GIS) in the context of location-based decision making. The research results show that GIS has a significant contribution in increasing the effectiveness and efficiency of the decision-making process by considering spatial factors.

Through its ability to visualize geographic data, perform spatial analysis, and facilitate the integration of various information sources, GIS provides a powerful tool for decision makers to understand, analyze, and respond to geographic conditions related to decisions taken. Thus, GIS is not only an information technology, but also an important framework in supporting decision-making processes in various fields such as city development, natural resource management, transportation and business.

By understanding the important role of GIS in location-based decision making, it is hoped that this research can provide valuable guidance for practitioners, decision makers and other stakeholders in optimally utilizing the potential of GIS to achieve better and more sustainable results in various decision contexts.

Therefore, it is important to continue to undertake further research and development in this area, both to increase our understanding of the role of GIS in decision making and to develop more sophisticated and reliable GIS technologies in the future. In this way, we can continue to harness the potential of GIS to create a greater positive impact in location-based decision making in the ever-evolving digital era.

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