Article Journal of Asian Geography, 2024, Volume 3 (Issue 1), 18-25.
https://doi.org/10.36777/jag2024.3.1.2

GIS and Geospatial Approaches for Political Science Studies: Urban Development Analysis

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Received: 13 Oct 2023, Revised: 15 Feb 2024; Accepted: 18 Mac 2024; Published 29 Mac 2024

Abstract: A geographic information system (GIS) is a tool that collects, organises, interprets, and maps different kinds of data. The geospatial method consists of the gathering, displaying, and manipulating of imagery, the Global Positioning System (GPS), satellite photos, and historical data that are used with geographic models and either explicitly specified in terms of geographic coordinates. Political science studies regional, state, and national governments, political actors, political discourse in the media, and the connections between political figures and groups. In this study, Geographic Information Systems and Geospatial approaches for Political Science studies are used to develop urban development analysis. Political scientists have been incorporating GIS technology into their statistical analyses in recent years. The objective of this study is to understand the use of geospatial in the context of political science. This study's attempt to understand the GIS as a mix of technology, methodology, and situated social practices is the foundation of the GIS. Findings show that the development of a permanent and easily editable database in a particular area, where various types of data may be kept, merged, and graphically displayed, makes GIS technologies all this simpler and more practical to use in political studies. GIS allows researchers to deal with complex, multivariate, and multidimensional historical processes more successfully, as well as uncover historical, political, or social issues that may not always be readily apparent when using more conventional research and analytical techniques.

Keywords: geographic information system, political science, urban development

1.0 Introduction

A system called a Geographic Information System (GIS) is used to collect, organize, analyze, and map different kinds of data. The geospatial approach consists of gathering, displaying, and manipulating imagery, the Global Positioning System (GPS), satellite photography, and historical data that are then applied to geographic models and are either explicitly described in terms of geographic coordinates or implicitly, such as by a street address, postal code, or forest stand identifier. Political science, on the other hand, examines power and politics from a comparative, global, and national perspective. Understanding political concepts, ideologies, institutions, policies, procedures, and conduct is necessary for understanding political groupings, classes, governments, diplomacy, law, strategy, and war. Education in political science is advantageous for pursuing future careers in public service, law, business, and the media, as well as for civic engagement and political participation. Political science studies regional, state, and national governments, political actors, political discourse in the media, and connections between political figures and groups. It is a branch of analysis that looks at practical information gleaned from patterns, dynamics, and results in diverse political domains. The field's reach is broad, encompassing both local communities and the entire world. At its foundation, political science is concerned with power: its history, the political organisations and persons that wield it, how they do so, the challenges to that power, and the repercussions for the people who live nearby *(Grimsley, 2022)*.

Political scientists have started employing Geographic Information Systems (GIS) technology in their statistical analyses more and more recently. The reason is that political scientists are starting to understand more and more how GIS technology can help them overcome some of the major challenges they encounter when conducting systematic research. From this perspective, the representational, analytical, and epistemological methods of GIS are what make them what they are. These methods are all seen as being influenced by the institutional practices and social, political, and disciplinary norms from which they develop *(Cope & Elwood, 2009)*. This understanding of GIS owes a lot to scholars' efforts to refute assertions that positivism is inherent in GIS and clarify how the social and political influence of GIS may be generated *(Pavlovskaya, 2006)*. This study's understanding of GIS as a mix of technology, methodology, and situated social practice is the foundation of GIS. With the development of a permanent and easily editable database in a particular area, where various types of data may be kept, merged, and graphically displayed, GIS technologies make all this simpler. Two essential and enduring ideas have maintained their significance in the modern spatial and quantitative analysis of political, and geographic events. The theoretical and empirical understanding of context (places) and nonstationary continue to be problems in spatial analysis. fundamental inquiries into issues with "neighborhood," the social setting in which political exchanges take place, definition, and evaluation. Spatial analysis' nature and research outlook have seen three significant changes in the past decades. Due to considerable improvements in data availability, data analysis, and new methodological tools, geography and related social sciences are now more generally accessible to a wider audience *(Linke & O'Loughlin, 2000)*.

Political geographers all concur that the social context of events influences both individual and group-level behaviors and attitudes, despite taking different approaches and concentrating on various issues. A constellation of influences, combining aggregate and individual factors at scales ranging from the individual to the locality to the national and international levels, shapes political actions like voting decisions, territorial control disputes, the delineation and demarcation of political boundaries, and the provision and distribution of public goods *(Linke & O'Loughlin, 2000)*. For more than a century, political geographers have concentrated on the effects of politics in different contexts. Other social sciences, on the other hand, tend to "atomize" people and overlook or undervalue interactions between them and their social environments. This paper's goal is to investigate urban development analysis for Political Science studies using a Geographic Information System and geospatial approach.

2.0 Comparative studies

In these studies, a comparative analysis is applied to analyze and compare the multi-perspective literature on various studies in social science that used Geographic Information Systems (GIS). This method demonstrates the ability to examine and compare subjects or ideas. As a result, a comparative analysis can show how two pieces of information in the literature are similar or how two pieces of information in the literature are different in social science that used GIS. The various studies in social sciences applicable to be referred to table 1:

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Table 1: The multi-perspective works of literature on various studies in social science that used GIS

Authors	Year	Title	Places	Social science that used GIS
Shanker Satyanath	2001	GIS in Political Science	Africa	In the regions of Africa where there was conflict, the collection of rainfall data was frequently abandoned. We make use of NASA-distributed rainfall data. In this instance, the GIS data allowed us to investigate the connection between climate shocks and civil conflict in Africa.
Shanker Satyanath	2001	GIS in Political Science	Russia	When trying to obtain information about which villages the Russian government had bombed in Chechnya during the conflict there, Jason Lyall encountered insurmountable difficulties. Since Lyall wanted to know whether bombing a town decreased insurgent activity in that village, this posed a serious problem. He determined which villages had been bombed and which hadn't used satellite images.
Shanker Satyanath	2001	GIS in Political Science	Baghdad	To assess the success of infrastructure development in war-torn Baghdad, Brian Min used GIS technology. During the fighting, it was difficult to collect detailed information about the infrastructure. He got around this issue by using satellite images of the city's signature light pattern and using the intensity of city lights at night as a sign of infrastructure renewal.
John E. Ashbrook	2006	Using GIS as an analytical tool in the analysis of politics in Eastern Europe: Istria in the 1990s	Europe	Some historians use GIS to create databases, improve geographic representation, and as a potent tool for analysis.
David Rumsey & Meredith Williams	2002	Historical Maps in GIS	California	The list of projects that use GIS is more accurate thanks to technology, which enables comparisons of historical maps with those made in the present.
David Staley	2015	Computer, visualization, and history	New York	Technology in the historical field claims that GIS is advantageous for historians and can correlate a variety of data types, presenting them in an accurate and well-designed map format. It is a technique for visualizing data that could refute conventional interpretations or reveal previously "hidden" data for further investigation.
Ian Gregory & Humphrey Southall	2002	Mapping British Population History	United Kingdom	A more comprehensive understanding of history could be provided by GIS when combined with other academic disciplines. Once spatially referenced databases are created, a problem can be greatly reduced.
Josh E. Ashbrook	2006	Using GIS as an analytical tool in the analysis of politics in Eastern Europe: Istria in the 1990s	Europe	The presentation and analysis of spatially dependent data about voting and voting patterns in two countries during three elections can be aided by GIS.
M Horn	2005	GIS and the Geography of Politics	Australia	Some of the issues raised above will be illustrated by a description of the Australian experience over the past ten years, particularly the coordination of various spatial data types and the potential future directions for district support software. It might also be interesting to look at the needs and GIS tactics of sizable public sector GIS users.
Sushobhan Majumdar & Lakshmi Sivaramakrishnan	2019	Mapping of Urban Growth Dynamics in Kolkata Metropolitan Area: A Geospatial Approach	India	The study illustrates temporal variations in the population's mean center in and around Kolkata. Additionally, it tries to examine how land use is changing and how supervised categorization approaches have been applied.
Hein E. Goemans & Kenneth A. Schultz	2016	The Politics of Territorial Claims: A Geospatial Approach Applied to Africa	Africa	The geospatial approach enables an analysis of variation both within and between dyadic borders, which aids in eradicating aggregation problems. We discover that the institutional characteristics of the wall play a supporting role in ethnic and political considerations as the primary driver of territorial claims in Africa.

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2.1 GIS on political science studies

To allow for the integration and comparison of contextual data from social as well as environmental or physical standpoints, a Geographic Information System (GIS) is required in the use of Political Science Studies. Researchers must pinpoint the locations of the variations, parallels, correlations, and interactions. A study can incorporate both qualitative and quantitative variables using a GIS. GIS in Political Science Studies can help visualize the results, identify pattern analysis, accommodate spatial relationships, and others. Social science is a field of study that focuses on examining how people interact with one another and live in society. It also examines the many political systems and cultural practices used throughout human history to guide human behavior. They also look at how people are trying to survive in the face of the resource limitations brought on by economic geography. Because of his thorough research on human behavior, man is now studying and exploring the planet more than ever. Thus, GIS has also become a significant function in these social sciences that are fundamental to human beings.

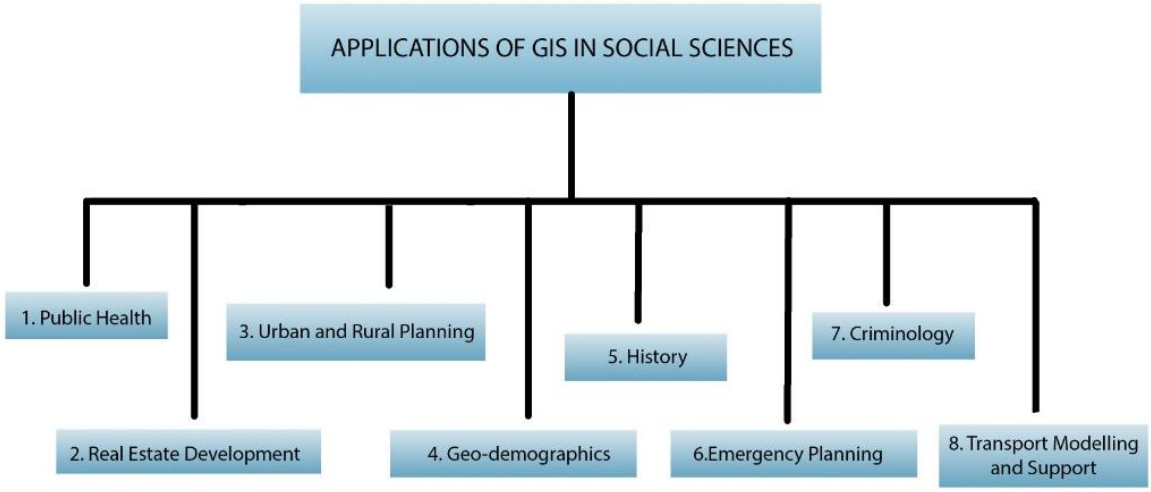

Figure 1: The Application of GIS in Social Sciences

Some of the applications of Geographic Information Systems (GIS) in social sciences include:

1. Public Health
   Public health aims to deal with the health problems that affect people on a fundamental level or even from a more comprehensive national viewpoint. Geographic Information Systems is one of the few systems the government employs for statistics regarding disease outbreaks (Makroui and Mohd Noor, 2016). However, this does not always imply that GIS is only engaged in times of emergency; it may also be utilized to ensure the prevention and control of specific diseases. The potential of GIS to provide mapping capabilities has been demonstrated to be effective in the health sector as well. Digital maps also allow for the sharing and display of disease patterns in the past. These maps can be zoomed in for better clarity and a wider field of vision. Over time, the enormous ambiguity of GIS in the health sector has been exacerbated by the accessibility of digital maps in any location on Earth. Better decision-making in health-related matters is fully attainable with these powerful functionalities. The association between geographic features and the diseases that residents of specific areas develop can also be ascertained using GIS. Data from many sources can be gathered via secure geographic information systems, which can then be subjected to statistical analysis.

2. Real Estate Development
   One of the functions of Geographic Information Systems in real estate is mapping in the survey, geographic information, and location addresses. To assist investors in deciding which places would most likely prosper and function for real estate, a sizable amount of data is studied. Even the population and demographic characteristics present in a particular location are considered. The best land can be categorized and structured together with its qualities. Even updating clients who have expressed interest in real estate with new information may be possible with robust geographic systems (Arabinda and Chadetrik, 2013).

3. Urban and Rural Planning
   Geographic Information Systems (GIS) is developing several concepts and innovations to guarantee the creation of world-class cities, towns, and rural areas with the least amount of traffic. Geographic information systems are also in control of many projects like power, roads, railways, optic fiber, water, and sewer lines that govern how an urban or rural area is developed (Ershad. 2020).

4. Geo-demographics
   This social science investigates the inhabitants of a specific area. This population may include people or occasionally even animals. Geo-demographics primarily aim to address the population density in each location over a particular period. GIS can therefore be used to examine population maps (Diana, Tudor, and Ioana, et al 2021).

5. History
The social science of history focuses on investigating historical events. The study of how geographical features like volcanoes formed mountains, plateaus, hills, plains, and depressions are known as geographic history. All these characteristics had an impact on the humans who were alive at the time, and they must be researched to be vigilant even now. The study and excavation of fossils are other aspects of history. Human remains and fuels like petroleum are among the studied fossils. After extensive geo-activities, these remnants are typically buried quite profoundly beneath the earth's surface. As a result, assembling relevant information without using geographic systems like GIS may be challenging. Historians who wish to conduct additional research on them might use the Geographic Information System to examine their depths and attributes before ever conducting an actual excavation. Thus, GIS is crucial for tracing the history of human existence (Stetler, 2014).

6. Emergency Planning
Geographic Information Systems has a lot of uses in this area of study. We can all agree that unexpected crises occasionally arise, and rational choices must be made to save lives. These calamities, such as floods and fires, call for a prompt response from the appropriate authorities in several nations, which has been done manually (Mobaied, 2016). However, over time, most governments have started to use GIS to support any necessary analyses. GIS can relate to weather systems to provide forecasts and practical statistics that support government decision-making. Any base station on Earth can receive satellite photos of disaster-prone areas for analysis and transmission for GIS processing. These devices would dispatch assistance to facilitate navigation during affected victims' evacuation procedures (Wilhelmi, and Jeffrey. 2003).

7. Criminology
The use of Geographic Information Systems has greatly aided intelligence services' criminal investigations. It is possible to find people who may be engaging in illegal activity. Some satellites can even view photographs of the earth, which can be used to track down people who are evading the reach of the law. For the sake of investigations, digital pictures stored on police agencies' computer systems are efficiently delivered (Salih and Mark, 2010).

8. Transport Modelling and Support
One of the transportation sectors that Geographic Information Systems supports the most is aviation. Because air travel is so fragile, systems must be exact to prevent tragic airline crashes. Radars integrated with GIS may be used to track the location of airplanes, which is highly helpful when reporting any air transport emergencies that can call for immediate action. Before they are built, structures built on highways and railroads must also be thoroughly studied. Some locations with potential for future danger cannot have the road and rail projects finished. Therefore, it is simpler to research how drainage characteristics and slopes may affect transportation systems now or in the future (Shih. 2010).

2.2 How GIS Can Help Address the Uncertain Geographic Context Problem in Social Science Research

One of the most important topics in social science research is how a place's characteristics affect people's actions or experiences there. When a study uses area-based variables to explain or predict specific behaviors or outcomes, such as when data from census tracts or blocks are used, there are two main methodological problems. The changeable areal unit problem, one of these issues, is considerably better understood than the other. The likelihood that the zoning plan and/or geographic size of the areal units used may affect analytical results on the effects of area-based factors is the subject of this well-known problem. There has been much less focus on the other crucial methodological problem for any social science study that examines how geographic factors influence behaviors or outcomes. The second problem relates to the possibility that the precise geographic delineations of contextual units or neighborhoods and the contextual units' departure from the actual geographic context may affect the analytical findings regarding the interactions between geographic variables and outcome variables. To get around these restrictions and more effectively address the uncertain geographic context problem in social science research, we need new conceptualizations of geographic context that can account for the intricate spatial and temporal configuration of individual contexts as well as new analytical techniques for defining these contextual units *(Kwan, 2012)*.

2.3 GIS, GPS, and Location-Aware Mobile Devices

GIS, GPS, and location-aware mobile devices are additional strategies to help researchers in the social sciences get around the issue of uncertain geographic context. By gathering and analyzing data on people's movements and the spatiotemporal dynamics of environmental influences, GIS and GPS technologies can aid the researcher in better capturing the intricate spatial and temporal configuration of people's actual geographic context (Oyana, 2017). These technologies help researchers in the social sciences deal with the issue of ambiguous geographic context. For instance, using GIS to define people's activity space appears to have the potential to address the issue of the ambiguous spatial environment in social science research *(Kwan, 2012)*

Another area where GIS may be particularly helpful for addressing the problem of unknown spatial context in social science research is the precise estimation of people's exposure to environmental effects. Essential issues for such assessments include calculating the spatiotemporal variability of ecological factors, such as airborne contaminants, and figuring out when people are affected by them given their spatial mobility. Despite the difficulty of the work, GIS can help by capturing the spatiotemporal dynamics of environmental effects and the unique space-time trajectories of individuals, and then combining the information into the proper analytical framework (Carré and Hamdani. 2021). For instance, researchers collected 24-hour activity diary data from participants and created a space-time exposure modeling tool to evaluate participants' travel-time exposure to traffic-related pollution. In essence, the model was a GIS that combined four different smaller sub-models. Each of these sub-models focuses

on a different aspect of assessing exposure, like an air pollution dispersion model *(Kwan, 2012)*. As a result, when information about people's space-time constraints is available, potential activity spaces may be created using specialized geo-computational algorithms. This second concept of activity space, also known as the daily potential path area in the language of temporal geography, is less frequently employed in social science research than genuine activity space due to its data and geo-computational requirements (Kwan, 2012).

2.4 Qualitative and Web-based GIS

Using qualitative and web-based GIS is another technique that can assist in overcoming the issue of unknown spatial context in social science research. In social science research, using GIS to document people's social interactions and experiences in varied contexts may also provide a solution to the problem of unclear geographic context. Integrating qualitative and quantitative information using mixed techniques and qualitative GIS is a promising field in this respect. For instance, the qualitative GIS technique known as geo-ethnography to document and capture the complexity in people's daily lives and the places they travel. Researchers combined family and neighborhood ethnographies in the study using a GIS, which allowed them to see and understand the complexity of the participants' lives *(Kwan and Guoxiang. 2008).* Scholars have also studied how to define more relevant contextual regions or neighborhoods using GIS and web-based mapping technologies. For instance, they have developed a web application called VERITAS that integrates several interactive mapping features from Google Maps. The application was used to keep track of the participants' trips to their destinations and how much they identified with their neighborhood of residence and other activity locations (such as their employment, means of transportation, and leisure activities). Additionally, it enables researchers to geocode and map participant activity areas and define their perceived or actual communities. The technique can assist research in uncovering the real spatial context by collecting the non-residential activity sites individuals frequent in their everyday lives *(Saadallah, Dina. 2020).*

It elaborated on the nature of the issue of unknown geographic context in social science research and looked at how GIS and geospatial technology might help with the issue's resolution. The article also argued that new conceptualizations of geographic context, which consider the precise spatial and temporal arrangement of contextual influences, would enable us to assess the effects of these influences (or neighborhood effects) more accurately on each subject. Where and when people spend their time varies from person to person, so these new concepts of context need to be operationalized through personalized metrics that allow the contextual unit or exposure level to change even for individuals within the same neighborhood or family.

3.0 Issues and Challenges

3.1 Issues

Although this chapter has mostly focused on technical and analytical issues in political geography from a public policy perspective, political parties have been active users of GIS for many years. Two distinct areas of interest could be found in this regard. First, a party will naturally attempt to ensure that it is not mistreated in light of the political criteria mentioned earlier, even in highly regulated districting processes. As a result, the party will be interested in developing alternative proposals, perhaps using the same resources as governmental organizations *(Horn, 2005)*. The second strand focuses on developing electioneering strategies and plans, utilizing a GIS analysis approach akin to that employed in regionally focused marketing activity *(Hagens & Fairfax, 1996)*.

In addition, this field of study has not taken into account several other characteristics linked to socio-economic vulnerability, such as education and income level, disability, family size, and so forth due to the limited data availability. A temporal dynamic vulnerability assessment procedure is also missing in place of recent situation analysis. When the monitoring index is routinely updated, it would be possible to identify temporal and spatial vulnerability patterns for select key node cities. Other than that, because it lies outside the scope of this field of study, the distinction between urban and rural locations is not taken into account when assessing risk. By treating the urban core and rural areas as two different ends of a continuum, we expect to discover spatial variations in heat vulnerability *(Sun & Li, 2022)*.

3.2 Challenges

The challenges are, first accurate data collection by governments in many underdeveloped nations is frequently inadequate. Second, governments frequently refuse to make such data available to academics even when they collect it (for instance, when there are security implications). Last but not least, data that has been gathered by people may have endogeneity problems, which means that the phenomenon that researchers are trying to understand might affect the data itself. For instance, even if some research had statistically sufficient sample sizes, other studies might have benefited from even larger samples. The results would have been even more thorough in illustrating how the selection relies on GIS if an additional selection had been included. Plus, response bias can impact the sample-survey technique of study, leading to an over- or under-reporting of an actual situation.

4.0 Future Outlooks and Recommendations

4.1 Future outlooks

Thanks to computational approaches and data sciences, conventional GIS is developing into a new, comprehensive field comprising urban analytics, location intelligence, and, more recently, GeoAI. *(Kandt & Batty, 2020)*. Utilizing traditional methodologies like OLS regression and kernel density estimation as well as more modern computation techniques like spatial network analysis and density-based spatial clustering techniques, geospatial research has been used in a variety of applications, such as transportation, retail, and social interactions. The three sub-outlooks listed below offer a research agenda for pursuing further advancements in GIS and data *(Li, Zhao, & Zhong, 2022)*.

4.2 Recommendation

In social science research, geospatial technology is a developing field. A geographic information system (GIS) is a technological tool for understanding geography that enables users to select particular geographic information from the map for

a project or activity. It does this by organizing geographic data. Social scientists examine various patterns to connect people's lives in society by looking into the multiple ways that sociocultural or socio-political issues have influenced people's lives throughout history or in the present. Another crucial area of the social sciences is economic geography, which is connected to the study of how people struggle to survive with the resources at their disposal. This new feature has made it possible to conduct more extensive and in-depth research on investigating the earth's riches. A remarkable fusion of theory and application exists between GIS and the social sciences. With the expansion of the human realm, GIS applications expand as well. This is made possible by examining the interactions between human geography and several significant issues, combining GIS and spatial analysis to demonstrate the value of GIS applications in resolving difficult real-time problems *(Borpujari, 2020)*.

5.0 Result and Findings

In recent years, political scientists have increasingly begun to make use of GIS technology in their statistical analyses. The reason is that political scientists have increasingly begun to realize that GIS technology offers them a convenient and reliable way to address some of the major obstacles that they face when conducting systematic research. The capabilities of GIS to store, view, analyze, and interpret geographic data, and computer-based technologies were well-established and well-known in various areas including political Sciences. Geographic data, also referred to as spatial or geospatial data, determines the location of features on a map and is commonly useful in that area consisting of anything that can be mapped and connected to a specific location on the Earth. Roads, national borders, and addresses are a few examples of spatial data. Based on the findings of the literature, it stated that GIS is commonly utilized in political science purposely to:

- Examine voting trends and practices,
- Identify polling places and other voting equipment,
- Allocate money for elections,
- Observe political contributions,
- Replenish congressional districts, among other things,
- Organize outreach efforts and make plans for political campaigns.

GIS plays a crucial role in political science studies by providing a framework for analyzing and visualizing data related to geographical politics. It allows us to map and understand the spatial distribution of information such as election areas, identify high-risk areas, and explore the underlying factors contributing to certain circumstances that relate to spatial information. GIS also enables the integration of various data sources, such as demographic information, sentiment data, and events data, to examine the complex dynamics of political science scenarios. By using data analytic tools and techniques, GIS helps researchers make sense of the rapidly changing world and provides valuable insights for policymakers.

This study examines a GIS, a tool for creating, gathering, analyzing, and mapping different types of data. Geospatial techniques involve the collection, presentation, and manipulation of pictures, GPS, satellite imagery, and historical data that are utilized with geographic models that are explicitly described in terms of geographic coordinates. Political actors, political discourse in the media, relationships between political leaders and groups, and regional, state, and federal governments are all topics covered in political science. According to this study, GIS is a confluence of methodology, technology, and situated social activity. By establishing a permanent and easily editable database in a specific location where various types of data may be stored, combined, and visually displayed, GIS technology makes all of this easier to manage. Using GIS, a researcher can identify historical, political, or social concerns that are not necessarily obvious when using more standard research and analytical tools, and deal with complex, multivariate, and multidimensional historical processes more successfully.

GIS can be used in social science and humanities research to analyze the relationships and phenomena more effectively being studied. While grafting data into a visual form may prove challenging, maps can enhance ethnographic methodologies and offer a more thorough study of the data. Next, GIS can make spatial analysis and modeling easier, which can assist with several essential activities related to urban planning. Among these responsibilities are site selection, land suitability analyses, land use and transportation models, defining planning action areas, and impact evaluations. By combining GIS and spatial analysis in political science in the context of urban development, it examines how human geography can interact with several crucial policy concerns and highlights the value of applied GIS and spatial analysis for resolving practical difficulties in both the public and commercial sectors. With GIS, it is also possible to incorporate and compare contextual data from both a social and an environmental or physical aspect. The locations of variations, parallels, correlations, and interactions can be found by researchers. Using a GIS, a study can include both qualitative and quantitative traits. GIS can assist with the visualization of results, discover patterns, accommodate geographical links, and other political science studies.

However, there are some issues and challenges. First, accurate data collection by governments in many developing countries is typically insufficient. Second, governments typically reject requests from academics to access such data even when they are collected (for instance, when there are security implications). Last but not least, human-generated data may experience endogeneity issues, which means that the phenomenon that researchers are attempting to explain may have an impact on the data itself. As a result, data that has been gathered by people may have endogeneity problems, which means that the phenomenon that researchers are trying to explain can affect the data itself. For instance, other studies may have benefited from even greater samples, even though some had statistically appropriate sample sizes. If more pieces had been added, the results would have been even more complete in demonstrating how the selection relies on GIS. Additionally, response bias may affect the sample-survey methodology of the study, causing an over- or under-reporting of a real circumstance. To overcome the issue, a comparative research methodology is applied in this study to analyze and contrast the multi-perspective literature on various social science studies that used GIS. This technique shows that you can analyze and determine different topics or viewpoints. Therefore, in social science that uses GIS, comparison research can demonstrate how two pieces of information in the literature are comparable or dissimilar.

Furthermore, Urban Development Analysis is created in this study using Geographic Information Systems and geospatial methods for Political Science investigations. Political scientists have recently started incorporating GIS technology into their statistical analysis. According to this study, GIS is a confluence of methodology, technology, and situated social activity. By establishing a permanent and easily editable database in a specific location where various types of data may be saved, merged, and visually shown, GIS technology makes all of this easier to manage. Finally, by using GIS, a researcher can manage complicated, multivariate, and multidimensional historical processes with greater effectiveness and might expose historical, political, or social issues that might not always be visible when using more standard research and analytical techniques. Economic geography, which is related to the study of how people strive to exist with the resources at their disposal, is another crucial field of the social sciences. Research on the earth's treasures may now be done more thoroughly and in-depth thanks to this new function. GIS and the social sciences have a remarkable theoretical and practical synergy. Applications of GIS are growing along with the

human world. This is made possible by examining the interactions between physical geography and several significant challenges, combining GIS and spatial analysis, and showcasing the usefulness of GIS applications in addressing challenging real-time difficulties.

6.0 Conclusions

In summary, a researcher can deal with complex, multivariate, and multidimensional historical processes more successfully and uncover historical, political, or social concerns that are not always obvious when utilizing more conventional research and analytical procedures. A database may be used by subsequent researchers to build upon and change prior studies after it has been developed and made accessible to everybody. This research, which is a part of the more significant inquiry, exemplifies how GIS may be used to examine the challenging problems confronting regional scholars. The study team has access to powerful tools for organizing, storing, presenting, and analyzing these multiple unique types and sets of data thanks to geographic information systems. Many different forms of data need to be explored for a better understanding. Once a researcher, whether historical or not, builds a database and a basic map, they may simply be modified to reflect changes, adding layers of knowledge that are very hard to obtain outside of this medium. It is frequently easier to identify patterns in seemingly unrelated data, which can then be further investigated by a researcher using more traditional types of inquiry and analysis. GIS is an essential tool for researchers as a result *(Ashbrook, 2006)*. The study of geospatial technology is a recent development in social science. For a specific project or activity, users of a GIS, a technical tool for understanding geography, can choose specific geographic data from the map. This is accomplished by organizing geographic data. The numerous ways that sociocultural or socio-political concerns have impacted people's lives throughout history or in the present are examined by social scientists to connect patterns between people's lives in society. Another important field in the social sciences is economic geography, which examines how people attempt to survive with the resources they have available. The investigation of the treasures of the earth may now be done in more detail and breadth thanks to this new function. GIS and the social sciences have a remarkable theoretical and practical synergy. Applications of GIS are growing along with the human world. This is made possible by examining the relationships between human geography and several crucial issues, combining GIS and spatial analysis, and showcasing the usefulness of GIS applications in resolving challenging real-time issues *(Borpujari, 2020)*.

Acknowledgment: We would like to thank the Office of Ibn Khaldun Chair, Kuliyyah of Architecture and Environmental Design (KAED), International Islamic University Malaysia (IIUM), and Yayasan Kepimpinan Perdana for sponsoring this grant (SPP22-098-0098). We also gratefully acknowledge the anonymous reviewers for their valuable comments that helped to considerably improve the manuscript.

Conflicts of Interest: The authors declare no conflict of interest.

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