

Approved Tools & Techniques for Geographical & Geospatial Studies (With Special Reference to Pratapgarh District of Rajasthan)



Jeetesh Joshi
Research Scholar,
Deptt. of Geography,
M.L.S. University,
Udaipur, Rajasthan



Shivani Swarnkar
Assistant Professor,
Deptt. of Geography,
Govt. Meera Girls' College,
Udaipur, Rajasthan

Abstract

To be familiar with the unknown and to explore the unexplored has ever been the passion of man. Research aims at exploring the unknown, systematically studying the social phenomena and interpreting the cause and effect relationship of the problem. Scientific research relies on the application of the scientific method, a harnessing of curiosity. This type of research provides scientific information and theories for the explanation of the nature and the properties of the world around us. It makes practical applications possible. Scientific research can be subdivided into different classifications according to their academic and application disciplines.

In a legitimate scientific study of any problem in social sciences, all the steps of scientific method are strictly observed. The chief concern of the researcher is to find out the causes and results of the problem and then to analyse the cause and effect relationship of the problem in a way that he can arrive at some generalization.

The paper which is designed with a purpose of making an overview of social science research, aims at exploring the tools and methods which are generally used in social science research, and at pointing out ones that are helpful to the geographers associated with the study of urban sprawl around the world. For the purpose, the secondary data available in the various sources, and particularly on the various internet sites have been used.

Keywords: Primary Data, Secondary Data, Survey, Observation, Tools & Techniques, Research Methodology.

Introduction

Research can be defined as the search for knowledge, or as any systematic investigation, with an open mind, to establish facts, usually using a scientific method. The primary purpose for applied research (as opposed to basic research) is discovering, interpreting, and the development of methods and systems for the advancement of human knowledge on a wide variety of scientific matters of our world and the universe.

Research work traditionally defined as gathering data that can help to answer the questions about various aspects in the concern subject. The research work may be asked to provide answers to questions of theoretical interest to particular discipline. This may include such questions which have no interest to the society. The concepts of validity and reliability provide the criteria by which we need to judge our choice of research methods. These criteria determine the credibility and academic value of research work. Research should not considered as academic activity only, it also applies to all the respect of human activity. Research is basis for making decision effective and more meaningful. It includes the defining of research problem, formulating hypothesis, collecting of data, analyzing of data and arriving to conclusion.

Geographical studies based on survey and fieldwork fall in the empirical and experimental research for which the use of both the primary and the secondary data is essential. The geographers use both the types of data for their studies. The secondary data collected through the traditional sources, though a micro content analysis provide a feedback about the problem to be studied, while the primary data collected for the first time through the application of certain tools and techniques provide new information required for the study. Hence, for the geographical studies

the following both the types of research are helpful. The primary research helps the geographers make collection of data that does not yet exist, while the secondary research helps them make a summary, collation and/or synthesis of existing research.

On the basis of the nature of research, it can be classified as the qualitative research and the quantitative research. Both the types of research are conducted with different purposes and different in nature from each other. Qualitative research aims at understanding of human behavior and the reasons that govern such behavior, while quantitative research aims at systematic empirical investigation of quantitative properties and phenomena and their relationships.

For the sake of maintaining the scientific spirit in his work, the geographers generally rely more on the quantitative than in the qualitative research. Generally, research is understood to follow a certain structural process. Though step order may vary depending on the subject matter and researcher, the following steps are usually part of most formal research, both basic and applied:

1. Study of the related literature and concentration on some of the relevant studies on the selected theme
2. Content analysis of the studied related literature on the basis of the nation, authors, publication year and publishers, objectives, hypothesis, methodology, tools and techniques, findings etc.
3. Exploring research gap considering the major aspects of the theme to be studied
4. Selection of the Problem to be studied
5. Observation
6. Hypothesis formulation
7. Conceptual definitions
8. Operational definition
9. Collection of data
10. Analysis of data
11. Test, revising of hypothesis
12. Generalization.

Right from the first step, that is, observation and formation of the topic, to the last one, that is, generalization, all the steps of scientific method are observed by the geographers and thus geographical studies are made.

Approved Tools & Techniques for Research

The geographical and geospatial studies require a specific bent of mind of the researchers and specific methodology, or say, a different methodology and tools of study generally adopted by the researchers belonging to other social and natural sciences. Some of the popular research techniques adopted by the social scientists for the purpose of research, and which help them collect the primary and the secondary data include schedule, questionnaire, interview, case study etc. Each of the above research techniques has its own significance in research. As far as the geographical and geospatial studies are concerned, they being survey-and field work based and experimental and empirical in nature, require the physical presence of the geographers during the course of the study, the schedule technique is more reliable than the other quoted techniques of research.

Here it should be borne in mind that simply the schedule technique cannot provide all the information to the geographers, and so they need to add certain tests and experiments to the use of the schedule technique in order to make the study extensive and authentic. The techniques that geographers use in their work are not developed in a vacuum. They are developed to address specific problems and, thus, reflect the focus of the discipline at particular times. These techniques reflect the conscious decisions of geographers about the kinds of information that are important to be collected; the spatial scales at which information should be collected, compiled, analyzed, and displayed; data sampling strategies and experimental designs; data representation; and methods for data analysis. As theoretical paradigms change, so do the techniques for empirical research. Thus, advancement of the discipline goes hand in hand with the development of new and improved techniques for collecting, analyzing, and interpreting information.

Some of the methods, tools and techniques and other geographical study related stuff that are approved for the geographical and geospatial studies are enlisted as under-

Cartography

It is the design, construction and evaluation of maps. When designed well, maps can be powerful communication tools. The practice of cartography may require the knowledge of graphic design, computer science, mathematics, statistics, psychology and, most certainly, geography.

Digital Globes-

Digital globes are three dimensional representations of the Earth in high-resolution format. Digital globes provide many advantages. The user is able to scale up or down with ease since they are highly interactive. Digital globes are easy to transport since they are accessible on mobile and desktop computers, files can be shared easily and each user can choose a topic of interest to overlay on the globe.

Geographic Information

It is the collection of information about places and events that occur on the Earth's surface. GIScience research includes topics that relate to cartography, remote sensing, photogrammetry, web mapping and spatial data organization. Digital data management of spatial information is also associated with GIScience.

Geographic Information Systems (GIS)

They are systems for input, storage, manipulation, summarizing, editing, querying and visualizing geographic information.

Geovisualization

It is the display of geospatial information to be explored interactively in an effort to facilitate the process of hypothesis formation and knowledge construction.

Global Positioning System (GPS)

It is a satellite network that communicates with GPS receivers accessed by mobile users.

Location-Based Services (LBS)

They are services that offer information about where a location-aware device user is situated

Maps

They are mathematical representations of Earth and the Earth's surface. They can be used for geospatial data storage, spatial exploratory functions and as an analytical tool.

Remote Sensing

It is the use of satellites orbiting the Earth to capture information of the surface and atmosphere. Satellites vary in spatial and spectral resolution. These signals are then transmitted to receiving stations on Earth where they can be transformed and distributed as digital images to be analyzed. Through the use of remote sensing, applying specific calculations to images can help spatial information analyst identify and classify features on a landscape such as changes in snowmelt and identifying the location of seaponges without physically setting foot in that region.

Surveying

It is the science of accurate measurement of natural and humanmade features on the Earth. Data collected by surveyors are then used to create highly precise maps. Surveyors calculate the precise position of points, distances and angles through geometry.

Volunteered Geographic Information (VGI)

It is information collected by users roving the surface of the Earth. VGI is the contribution of content regarding local activities in various geographic locations around the world that may traditionally go unnoticed by the rest of the world's media.

Objectives of the Study

1. To interpret man's natural instinct to discover the unknown things
2. To study the meaning of research and to learn about various types of research
3. To study the types of data and their sources
4. To study the research process and the various steps that are undertaken by the researchers
5. To distinguish between the natural and social science research, and to concentrate on the research methods meant for the geographical and geospatial studies
6. To explore the various methods and tools and other geographical study related stuff useful for the geographical studies
7. To be familiar with each of the prescribed and suggested methods, techniques and other stuff for the geographical studies in Rajasthan
8. To compare and contrast the suggested tools and techniques for the geographical and geospatial studies
9. To arrive at the reliable tools, technologies and other services that can be helpful in the geospatial study of the Pratapgarh block in Pratapgarh district of Rajasthan from the various angles
10. To interpret and analyze the issue in detail

Review of Literature

Matthew A Zook & Mark Graham (2007) in Mapping DigiPlace: Geocoded Internet Data and the Representation of Place hold that The recent development of web-based services that combine spatial coordinates and indexes of online material

allows any web user to conduct geographically referenced Internet searches. In this paper we characterize the resulting hybrid space as DigiPlace—that is, the use of information ranked and mapped in cyberspace to navigate and understand physical places.

Chang-fan, et.al (2011) investigate the advantages of remote sensing technology is widely used in urban land use monitoring and high-resolution mapping. In this study the current use of high-resolution remote sensing technology to monitor urban land use change research status and analysis, which are the urban construction and the harmonious development of the ecological environment and provide scientific basis for decision making.

Shaughnessy, J., Zechmeister, E.& Jeanne, Z. (2011) observe that questionnaires are the most commonly used tool in survey research. However, the results of a particular survey are worthless if the questionnaire is written inadequately. Questionnaires should produce valid and reliable demographic variable measures and should yield valid and reliable individual disparities that self-report scales generate.

Verma Ravindra K., Kumari Sangeeta and Tiwary R. K.(2011) studied the Application of Remote sensing and GIS technique for efficient urban planning in India. They observed that the Indian cities will have to compete with others to attract investments and, therefore, issues like quality of infrastructure, energy efficient services provision and environmental conditions in a city besides economic stability would play a significant part in such competition. Urban planning profession in general will have to 9 address these issues and respond rapidly. It is worthwhile noting that spatial dynamics of cities is complex to fathom and urban theory is still static. In other words, the urban planning authorities and agencies in every parts of the country should adopt new technologies like remote sensing and GIS. These have capability to provide necessary physical input and intelligence for preparation of base maps, for planning proposals and act as monitoring tool during implementation phase(s).

T. Cheng (2012) in Methods and tools for geographical mapping and analysis in primary health care observes that mapping and spatial analysis of indicators of locality health profiles and healthcare needs assessment are well-established facets of health services research and development. Geographical perspectives are now playing a significant role in PHC delivery, and for those engaged in informatics and/or managing population-level care, understanding key geographic information systems methods and terminologies are important as is gaining greater familiarity with institutional aspects of implementation.

Tania Rossetto (2014) in Theorizing maps with literature observes that the long superficial engagement of literary scholars with the cartographic lexicon (under the label of literary 'spatial turn') has led to a need for a 'recartographization' of the field. This tendency, however, still remains primarily embedded within analytical ('cartography of literature') or critical ('critical literary cartography') approaches,

and fails to engage the recent development of post-representational rethinking of maps. Literary criticism, with its creative use of mapping words, and, above all, literary texts, with their involvement of practising maps, should be reconsidered as relevant sources for cartographic theorization and mapping research.

Junxiang Zhu , Graeme Wright , Jun Wang, and Xiangyu Wang (2018) in A Critical Review of the Integration of Geographic Information System and Building Information Modelling at the Data Level hold the idea that the benefits brought by the integration of Building Information Modelling (BIM) and Geographic Information Systems (GIS) are being proved by more and more research. The integration of the two systems is difficult for many reasons. Among them, data incompatibility is the most significant, as BIM and GIS data are created, managed, analyzed, stored, and visualized in different ways in terms of coordinate systems, scope of interest, and data structures.

Hypothesis

1. Moving from the unknown to the known is the natural instinct of man
2. Research satisfies the man's natural instinct to learn about the unknown things
3. Research aims at interpreting the cause and effect relations of the problems
4. For the sake of research, some specific methodology is adopted
5. Tools and techniques help the researcher to collect the data required for the study
6. Geographical researches and studies require specific methodology, tools and techniques
7. Geographical approaches are different from the approaches with which the studies in other social sciences are conducted
8. Pratapgarh district of Rajasthan is notable for its socio-cultural and demographic and educational transformation
9. Pratapgarh block needs to be studied geospatially for the sake of understanding the local features
10. Geospatial studies require specific methodology, tools and technology and other GI services

Methodology

The study is a focused on the research methodology pertaining to geographical and geospatial studies. For the purpose of understanding the research methodology, research design and tools and techniques of collecting data, the researcher simultaneously had his bent of mind on the various research methods in trend in the geographical studies and on the issue of geospatial analysis of things that needs to be studied specifically using the various latest tools and techniques. The steps undertaken by him include-selection of the title, going through the relevant related literature, selection of some of the studies found suitable for the purpose, content analysis, hypothesis formulation under alternative and null hypothesis in order to find a right direction for the work to be done, application of the analyzed contents in the context of geospatial study of the Pratapgarh block of Rajasthan, and finally arriving at findings and conclusion.

Findings

1. It is man's natural instinct to explore the unexplored and to know the unknown. He does not feel satisfied until he finds a satisfactory answer to his queries
2. Research is a panacea to all the natural and social problems as it helps in the understanding the causes and effects of the problem, and thus, in the control of the problem
3. Observation is the sole basis of research as it helps the researcher see the causes and effects of the problem with his own eyes
4. For geographical researches there are specific tools and techniques and a specific methodology which includes observation, surveying, remote sensing, cartography and mapping, display of geospatial information, digital globes, volunteered geographical information etc.
5. The approach of the geographer is more practical and practical than theoretical. His approach is different from the approaches of study adopted and applied by the researchers belonging to other fields
6. At present geospatial aspect of the geographical studies is a serious concern for the geographers and requires them to study it for the sake of deciding policies balancing the ecological, geological, demographic and other features

Conclusion

Research is a panacea to every challenge and problem whatever it is, and it can help one solve any problem through constant exploration. The steps in geographic inquiry are embodied in the "scientific method". The scientific method consists of systematic observation, formulation, testing and revision of hypotheses. If a hypothesis withstands the scrutiny of repeated experimentation and review it may be elevated to a theory. Theories may undergo revision as new data and research methods are improved. The scientific method includes: Observation, Hypothesis Formulation, Choose methods of analysis, Data collection, Analysis: Hypothesis testing, Hypothesis acceptance or rejection and Report results. Geographical studies require specific methods, tools and techniques.

The geographical, geospatial and geological studies and researches can help the geographers and the governments reshape and restructure the materialistic face of the Pratapgarh block in the Pratapgarh district of Rajasthan as per the contemporary demands.

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