

# INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE, IT & MANAGEMENT

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- Sharma T., Kwatra, G. (2008) Effectiveness of Social Advertising: A Study of Selected Campaigns, Corporate Social Responsibility, Edited by David Crowther & Nicholas Capaldi, Ashgate Research Companion to Corporate Social Responsibility, Chapter 15, pp 287-303.

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**A STUDY ON USAGE OF GEOSPATIAL TECHNOLOGIES IN POWER UTILITY**

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**ABSTRACT**

*Electricity Act 2002 was land mark in history of Indian Power sector, which paved the way for unbundling of power sector into Discoms and also led to participation of private players in all three phases i.e.; generation, transmission and distribution of this sector. The power utilities since then has travelled long journey from a just hardcore 'sarkari' govt organisation to now being slowly transformed to service industry. The power utilities since being service provide to consumers/citizens has adopted various innovative technologies which has enabled them to provide better and faster service; one such technology is GeoSpatial Technology. Still not all power utilities has adopted these technologies but still paper investigates the usage pattern, their problems related to usage and know how of Geospatial Technologies in one such power utility through discussions and unstructured interviews of the focussed group executives. The study can be of great help and learning for other utilities to define their strategy in rectification of problems of user departments and make use of this technology in full fledged scale. The study will also help the utilities who are just in nascent stage of implementation of GIS, as they can link the same with users right from the start of the project.*

**KEYWORDS**

power utility, GeoSpatial, users.

**INTRODUCTION**

Wikipedia defines GIS as geographic information system (GIS) is a system designed to capture, store, manipulate, analyze, manage, and present all types of geographical data. The acronym GIS is sometimes used for geographical information science or geospatial information studies to refer to the academic discipline or career of working with geographic information systems and is a large domain within the broader academic discipline of Geoinformatics. In the simplest terms, GIS is the merging of cartography, statistical analysis, and computer science technology.

This geographically referenced database in recent times has been of great aiding tool in improving of electrical utility performance, better planning and improving efficiency of various departments by adoption of this technology.

Geospatial technologies in last couple of years have seen exemplary application in utilities especially power sector. The importance of these was also felt by government of India and which was seen as the initiative of the Government of India and of the States, as the Accelerated Power Development & Reform Programme (APDRP) was launched in 2001, for the strengthening of Sub Transmission and Distribution network and reduction in AT&C losses.

The main objective of the programme was to bring Aggregate Technical & Commercial (AT&C) losses below 15% in five years in urban and in high-density areas. The scheme comprises of two parts-Part-A & Part-B.

**Part-A** of the Restructured-APDRP Scheme relating to base line data for Consumer Indexing, Geographical Information System (GIS) Mapping, Metering of Distribution Transformers (DTR's) and Feeders, and Automatic Data Logging for all Distribution Transformers and Feeders. It would also include adoption of IT applications for Meter Reading, Billing and Collection, Energy Accounting/Auditing., management Information System (MIS), redressal of consumer service centers and IT base consumer centers etc. [5]

The study basically tries to investigate in details the usage pattern of GeoSpatial technologies among the user departments in power utility. The study aims at motivation of user in using this new emerging technology and find out how geospatial technologies helps the user in decision making. The paper also tries to find the various problems which limits the usage of GIS to user departments and which can be taken up to maximise the usage and thus help the utility in improving efficiency.

**LITERATURE REVIEW**

Clarke, K. C., 1986 defines GIS as a information system that integrates, stores, edits, analyzes, shares, and displays geographic information for informing decision making. GIS applications are tools that allow users to create interactive queries (user-created searches), analyze spatial information, edit data in maps, and present the results of all these operations.

Dr.Rajani Mishra, Praveen Shukla,(2011),investigates use of e-resources by research scholars of Institute of Technology, Banaras Hindu University deals with the use of e-resources by the research scholars and to determine the extent to which research scholars of Institute of Technology, Banaras Hindu University (India) are aware and make use of e resources, to highlight the problems faced by them in accessing e-resources, their views on usefulness of e-resources compared to that of print resources and the place from where they prefer to access information.

Pramod Pathak & Govind Swaroop Pathak, 'Behavioural issues in accidents : A study of Coal Mines ' The present research endeavour is designed to get insights into the various causes of accidents in coal mines, as perceived by executives working in a coal mining organization.

Tarak Shah(2006) discusses on use of IT and geo spatial technologies taking Gujarat electricity board as case study, and also discusses various reforms which has led to decrease in losses and increase in revenue for the state government

Nandan Nilekani, 'IT Task Force Report for Power Sector', stressed on usage of by various SEBs to provide unified view of spatial (geographical) and a spatial (asset attributes) information for enhancing operations management.

**OBJECTIVES**

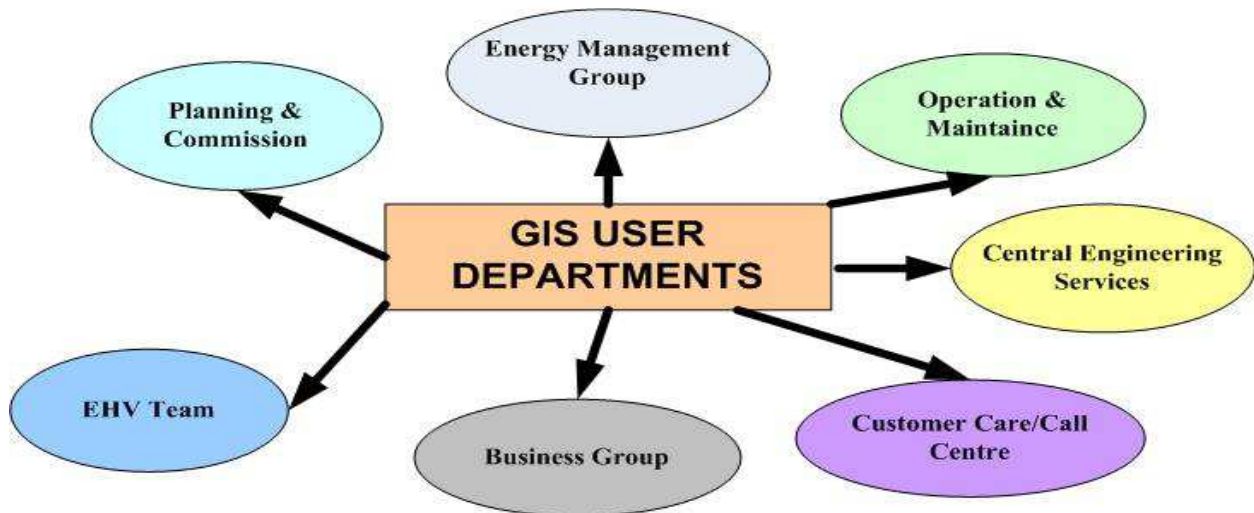
The objective of study is as follows:

- To find frequency of use of GIS by user Depts.
- To Study user requirements from GIS and how they take GIS inputs in their decision making.
- Problems faced by utility users for GIS Usage.

**METHODOLOGY**

The user departments of GIS in utility are shown in fig below.

FIG. 1.1



**SAMPLE**

The sample consisted 30 executives working in different departments of the utility.

**SAMPLING METHOD AND PLAN**

The method of sampling adopted for this study was ‘Purposive Sampling’, owing to the specific nature of research problem under investigation. The subjects constitute executives who were participants in 4 days program of Application of GeoSpatial Technologies for utilities at one of the certified training Centres of Ministry of Power in National Capital Region. Among these, the executives who voluntarily agreed to participate comprise our sample.

**PROCEDURE**

The data was collected by ‘a dual-moderator focus group interview’ (Malhotra, 2001). A focus group is an interview conducted by a trained moderator(s) in a non structured and natural manner with a small group of respondents. The moderator leads the discussion. During the discussion the participants were asked question and their views and experience on usage of the technology were taken. Some of the taken in the discussion and findings later. The main purpose of focus groups is to gain insights by listening to a group of people from the appropriate target market talk about issues of interest to the researcher. The value of the technique lies in the unexpected findings often obtained from a free flowing group discussion (for details, one may refer to Malhotra, 2001, Morgan, 1997).

Focus groups are the most important qualitative research procedure. They are so popular that many marketing research practitioners consider this technique synonymous with qualitative research (Garee & Schori, 1997). A focus group generally includes 8 to 12 member (Dachler, 1997; Fern, 1982). A focus group should be synonymous in terms of demographic and socioeconomic characteristics. Commonality among group members avoids interactions and conflicts among group members on side issues (Nelson & Fruitcake, 1988).

**DATA ANALYSIS & INTERPRETATION**

The data was collected during the interview were analyzed and presented in form of tables and figures illustrated below.

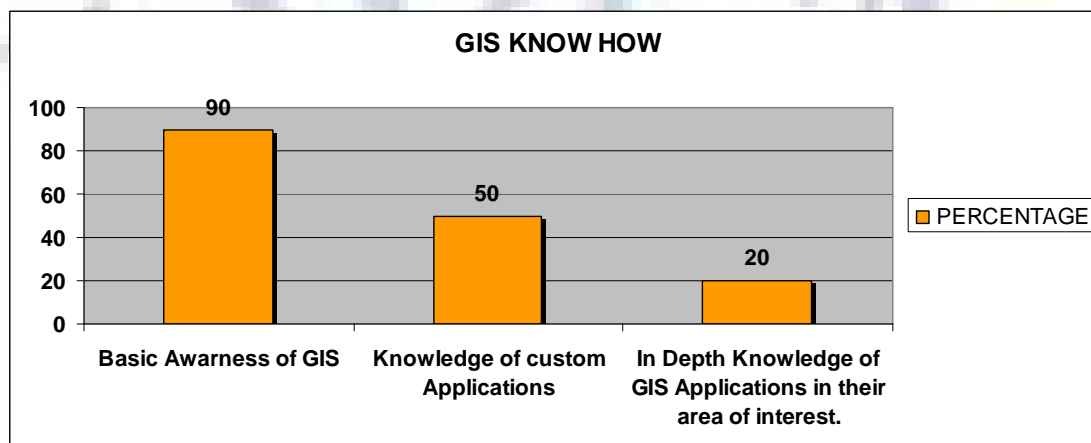
**KNOWLEDGE ABOUT GIS**

Through focus group interviews user departments were asked about they were aware about what is GIS, its capabilities and activities etc.

TABLE 1: KNOWLEDGE OF GIS

SL	PARTICULARS	PARTICIPANTS(30)	PERCENTAGE
1	Basic Awareness of GIS	27	90
2	Knowledge of custom Applications	15	50
3	In Depth Knowledge of GIS Applications in their area of interest.	6	20

FIGURE 1.1 KNOWLEDGE OF GIS





The graph clearly depicts that most of the user departments (90%) are aware about GIS, also 50 % of the user have knowledge of Custom Applications of GIS and applications. But very less of the users (20%) are not aware powerful capability of GIS technology. So, there is needed to make use the user departments more aware about GIS technologies usefulness for their day to day work and their area of interest.

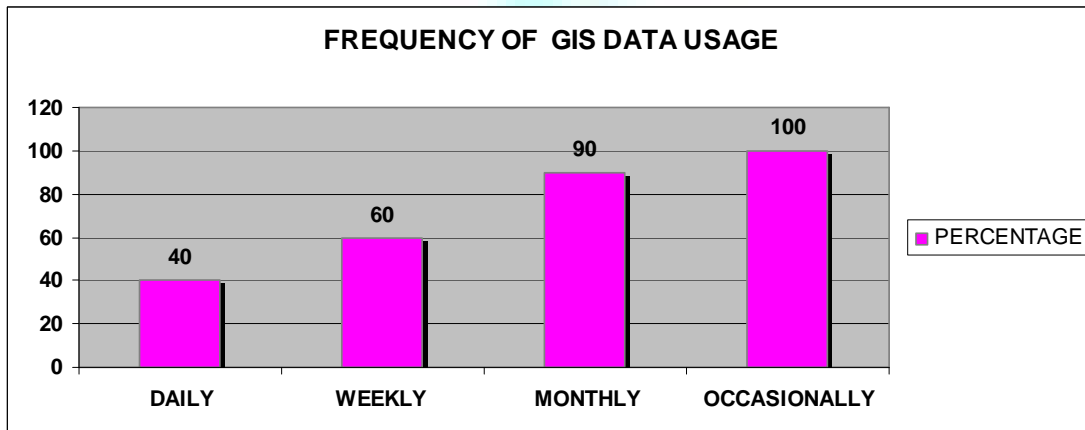
**FREQUENCY OF USE OF GIS**

This is basically to study how frequently the user uses GIS data in any form, the pattern of usage was studied. Most of the users use GIS data either monthly or occasionally. Daily usage of GIS data by the user is still very limited.

**TABLE 2: FREQUENCY OF GIS DATA USAGE**

FREQUENCY	PARTICIPANTS(30)	PERCENTAGE
DAILY	12	40
WEEKLY	18	60
MONTHLY	27	90
OCCASIONALLY	30	100

**FIG 2: FREQUENCY OF GIS DATA USAGE**



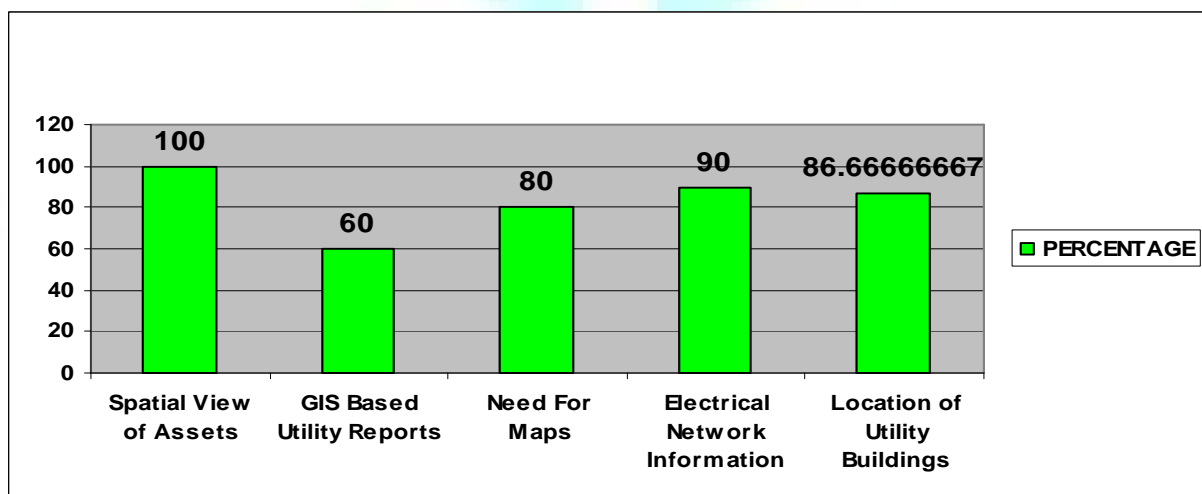
**WHAT USER WANT MOST FROM GIS**

The study tries to find out for what all different purpose User Departments needs GIS data. The study revealed that electrical network information is one of the biggest information which users demand from GIS. With **Delhi Geo-Spatial Data Infrastructure Act, 2011** coming into place , demand of GIS Maps mostly in pdf format and also increased by users as they need to attach with the schemes they prepare. Use of GIS Reports is less; the main factor accounting to this is that user wants reports with dynamic attributes, some of problems discussed in next section mainly accounts for this.

**TABLE-3: USAGE OF GIS DATA FOR DIFFERENT INFORMATION**

SL NO	What User want most from GIS	DESCRIPTION	PARTICIPANTS(30)	%
1	Spatial View of Assets	Location of DT/SSTN, Feeder etc	30	100
2	GIS Based Utility Reports	Reports Published by GIS	18	60
3	Need For Maps	Pdf/Print Out	24	80
4	Electrical Network Information	SLDs, DT/Feeder etc Info	27	90
5	Location of Utility Buildings	Nearest Complaint Centre, Cash Office	26	86.7

**FIG. 3: USAGE OF GIS DATA FOR DIFFERENT INFORMATION**



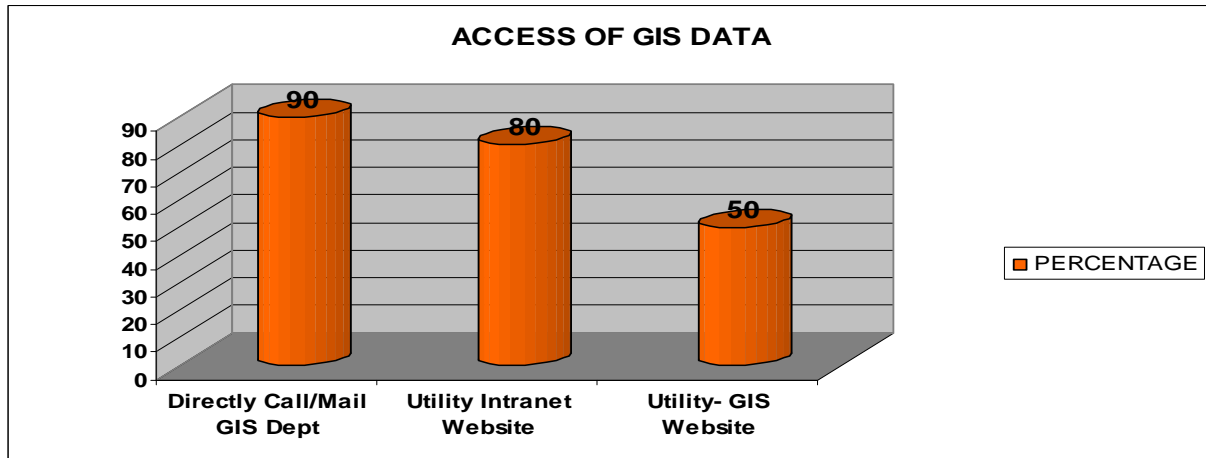
**METHODS OF ACCESS OF GIS INFORMATION**

In the Last section we discussed about different types of user information which user needs from GIS. Here the study tries to find out different ways through which user access GIS data for their requirements. The study revealed contacting GIS Dept either by mail or call is most prevalent way to get the required information which user needs. Access of Utility Intranet website is other major means of accessing information. The study clearly depicts usage of GIS website is not very popular among users.

TABLE 4: METHODS OF ACCESS OF GIS INFORMATION

ACCESS METHODS	PARTICIPANTS(30)	PERCENTAGE
Directly Call/Mail GIS Dept	27	90
Utility Intranet Website	24	80
Utility- GIS Website	15	50

FIG. 4: METHODS OF ACCESS OF GIS INFORMATION



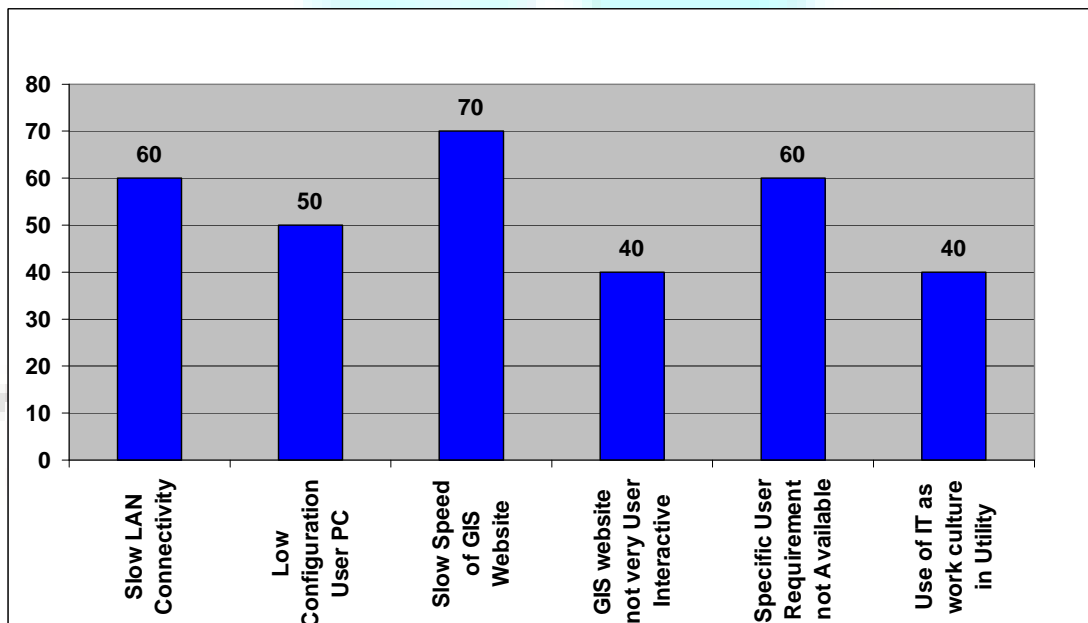
**HINDRANCES IN WIDESPREAD USAGE OF GIS**

The study analysed various problem encountered by the users which limits the usage of GIS in the organisation. The retrieval speed of GIS web and is not very interactive nature is one of major limitation which limits the usage of GIS. Other important factor is user specific information which user cannot get mainly due to various factors like non integration with other modules like SCADA, SAP, and OMS etc. The study also stressed on improvement of IT Infrastructure like user PC configuration i.e.; hardware and LAN Connectivity.

TABLE 5: HINDRANCES IN WIDESPREAD USAGE OF GIS

Causes	PARTICIPANTS(30)	PERCENTAGE
Slow LAN Connectivity	18	60
Low Configuration User PC	15	50
Slow Speed of GIS Website	21	70
GIS website not very User Interactive	12	40
Specific User Requirement not Available	18	60
Use of IT as work culture in Utility	12	40

FIG 5: HINDRANCES IN WIDESPREAD USAGE OF GIS



**RESULTS & FINDINGS**

The major findings of the study are as follows:

- Most of the user knows about GIS, but still awareness among about advanced application of this technology and how they can use for their day-day work.
- The utility management should focus on increasing frequency of usage of GIS as still most of the user uses it either occasionally /monthly or weekly. Very less user uses it daily.
- GIS data bank has enough information which user want which can be revealed, as 90% user want network related information from GIS and 80 % needs maps for various purposes. GIS Database has great demand among the users.

- The finding revealed access of GIS information in the organisation is still primitive as 90% user contact GIS dept for their requirements. The need is make the user more used to utility GIS website and does GIS analysis independently.
- Utility needs to address some IT infrastructure related issues in order to increase user level and their dependency on GIS.

### CONCLUSION & FUTURE SCOPE

The study revealed that users in various departments in the power utility are keen in using GeoSpatial technologies especially among young peers. The GIS Database has been appreciated and the participants found it very useful in taking key decisions. The management of the utility should focus on addressing the issues which has been found in the study. The study can also help other utilities of different states that are in stage of implementation of GIS and take the key learning from the finding in the research study.

Since the study which was conducted on focussed group though discussion and unstructured natural way of interview, the research in the level can be carried out based on Quantitative Analysis of research, and paves the way for next advanced research ' Road Ahead - Successful Implementation of Geospatial technologies in utility'

### GLOSSARY

GIS- Geographical Information System

SCADA- Supervisory Control & Data Acquisition System

OMS – Outage Management System

DT- Distribution Transformer

SLD- Single Line Diagram

SSTN- Sub Station

LAN- Local Area Network

EHV – Extra High Voltage

IT- Information Technology

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