



**UPES** Centre for  
Continuing Education

**A STUDY ON STRATEGIC TECHNOLOGY MANAGEMENT IN  
POWER DISTRIBUTION COMPANIES**

**BY**

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**A DISSERTATION REPORT SUBMITTED IN PARTIAL FULFILMENT  
OF THE REQUIREMENT FOR**

**MBA – (POWER MANAGEMENT)**

**of**

**UNIVERSITY OF PETROLEUM & ENERGY STUDIES, INDIA**

**SUBMITTED TO**

**CENTRE FOR CONTINUING EDUCATION**  
**UNIVERSITY OF PETROLEUM & ENERGY STUDIES,**  
**DEHRADUN, INDIA.**

**2019**



**LETTER OF ACCEPTANCE**

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**Subject:-Willingness for Guiding Dissertation of Mr. Naveen Naidu Karri, SAP ID. 500059816.**

Dear Sir,

Mr. Naveen Naidu Karri (Student Name) is registered for MBA [Power Management] (Program name), with the University of Petroleum & Energy Studies, Dehradun in the April- September, 2019 batch.

I hereby give my acceptance to guide the above student through the Dissertation work 'Titled: A Study on Strategic Technology Management in Power Distribution Companies – With reference to National Capital Region of India', which is a mandatory academic requirement for the award of the MBA (Power Management) degree.

Thanking You,

Yours Sincerely

Anil Kumar Singh

Date: 25<sup>th</sup> July, 2019.



## ABSTRACT

The present power distribution changes being received countrywide is producing inventive employments of IT applications utilizing state-of-the-workmanship technologies. The requirement for mechanization and reconciliation of between related business forms is driving the formation of a vigorous IT foundation traversing the total business esteem chain of power distribution. To deal with the expanding complexities of coordination and following difficulties, there is a developing spotlight on the appropriation of measures based technologies.

Power distribution system goes about as a scaffold between the clients and the utility. With evolving times, the purchaser's desire isn't power supply to them yet a solid and quality power supply with convenient redressal of objections. With approach of IT, and portable technologies changing of our lives, customers expects the utilities with exact metering and charging liberated from any blunders with offices like online installment of bills and from versatile applications All of these can be conceivable just by receiving imaginative and more brilliant technologies to check human mediation and give better administrations to the purchasers as far as taking care of grumbles and mechanize the buyer's redressal instrument. IT and related technologies likewise address in fathoming energy review issues and distinguishing proof of increasingly tricky zones and which needs more concentration and consideration.

The research attempts to evaluate the degree of technologies execution in power distribution organizations in National Capital Region and proposes a power distribution Technology Index. This research examines a portion of the significant IT intercessions in power distribution part in India, utilizing bleeding edge technologies in GIS, Network Analysis, Energy Audit and Customer Care.

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# CHAPTER 1

## INTRODUCTION

### 1.1 BACKGROUD OF THE STUDY

Effective Deployment of Information and Communication Technologies (ICT), in particular, Geospatial Technologies, can help the Power industry in performance improvement by building a strong and efficient power distribution system. Inefficiency electricity distribution systems results high AT&C (Aggregate Technical & Commercial Losses) losses, poor quality of power and reduced reliability of the power supply to consumers, leading by consumer dissatisfaction. It also affects the financial health of these utilities. The power of Technology has already been leveraged by electric utilities organizations in the developed countries, whereas deployment of ICT in India is significantly less, as compared to developed countries in the world. The states in India, which harnessed the power of these technologies, have succeeded in lowering their AT&C losses to a great extent, thereby improving the financial health of organizations. The research work has assessed the level of ICT deployment in Discom at NCR and evolves Technology Implementation Index, which captures relevant aspects on the use of various information, communication & automation technologies in Power Distribution companies.

This research has assessed of websites of Discoms in NCR, involving key determinant factors for website quality. The research further tries to find the aspects affecting acceptance and dissemination of ICT, in particular, Geospatial technology in Discoms in NCR and explore the association amid user acceptance aspects and user purpose to implement the ICT technology. The survey has been carried out among the staff of Power Distribution Companies (Discoms) using a questionnaire to gather information on the level of usage of ICT and factors influencing the use of technology in Discoms. The research resulted in form of development of comprehensive index, viz., Power Distribution Technology Index (PDTI). Further research resulted in the assessment of website of power distribution in National Capital region based different defined. The major part of the research of assessment of Adoption & Diffusion of GIS among State Owned & Quasi Government Power Distribution Companies in NCR helped in the development of new research framework which was used in this research to assess the Quasi-government companies and state government companies in Power Discom. The research wraps up by presenting conclusions, encapsulating the research outcome and outlining directions for future scope of research on the topic.

## 1.2 PROBLEM STATEMENT

With advent of IT, and mobile technologies changing of our lives, consumers expects the utilities with accurate metering and billing free from any errors with facilities like online payment of bills and from mobile applications All of these can be possible only by adopting innovative and smarter technologies applications to curb human intervention and provide better services to the consumers in terms of handling complaints and automate the consumer's redressed mechanism. Various applications build on IT and associated technologies also address in solving energy audit issues and identification of more problematic areas and which needs more focus and attention.

The research work would try to develop a new framework for the assessment of applications of technologies used in power distribution industry. The new framework would takes into consideration factors which are required in developing power distribution Index.

The research work focuses on the need of a robust website for power Discoms as it is one of the most important links between Discom and consumers directly. The research tries to find out different parameters which play important role in building the website and how factors like response time play a crucial role in solving many issues of the consumers. The research marks evaluation of the websites of Discoms in NCR based on different parameters defined in the new framework.

Adoption and diffusion of applications of technologies still remain as a matter of concern for most of the Discoms in India. The one of the main rationale of the research was to discover the how employees of quasi-government and government power distribution companies were utilizing geospatial technologies applications in their organization and various factors that were associated with level of utilization

- Calculation of level of acceptance of GIS technologies
- Consumption of GIS technology by the staff

With the development of technology, a numerous number of studies was been carried out for acceptance of Information Technology (IT) system in the organization, still, there is a need for research of acceptance of GIS in Indian Power distribution sector.

## **1.3 OBJECTIVES OF THE STUDY**

### **Research Objective 1**

To empirically evaluate the status of technology implementation among the power distribution companies by developing a comprehensive index, viz., Power Distribution Technology Index (PDTI) and to find out the correlation between the AT&C losses incurred by Discoms over the years and PDTI in improving their system.

### **Research Objective 2**

To identify key factors were measured as elements of quality of websites. Therefore to test its validity Chi-square test was used to analyze Discoms websites.

### **Research Objective 3**

The third research objective is to assess the Adoption & Diffusion of GIS among State Owned & Quasi Government Power Distribution Companies in NCR. The research intends to study various factors for adoption of GIS technologies and acceptance factors and intentions of the users to accept GIS technologies which are still in nascent stage in terms of technology acceptance and diffusion in the power companies. The research is an attempt to inspect and consider the aspects affecting the usage of GIS technologies among state-owned and quasi-government companies in National Capital region. Research Objective 3 aims at addressing this by developing a new framework and tests it and later on a comparison of government Discoms with quasi-government Discoms.

## **1.4 NEED FOR RESEARCH**

Power distribution system acts as a bridge between the customers and the utility. With changing times, the consumer's expectation is not power supply to them but a reliable and quality power supply with timely redressed of complaints. With the advent of IT and mobile technologies changing of our lives, consumers expect the utilities with accurate metering and billing free from any errors with facilities like online payment of bills and from mobile applications. All of these can be possible only by adopting innovative and smarter technologies to curb human intervention and provide better services to the consumers in terms of handling complaints and automate the consumer's redressed mechanism. IT and associated technologies also address in solving energy audit issues and identification of more problematic areas and which needs more focus and attention. The research would try to

access the level of technologies implementation in power distribution companies in National Capital Region.

### **1.5 AIM OF THE STUDY**

The Research Aim focusing on the factor and concern that underpin the most effective technology adoption by Power utilities for their various process and current issues faces which can be addressed. The research endeavor would to understand how power distribution companies have been using technologies, to what extent in their various operational process as well as business processes.

### **1.6 STRATEGIC TECHNOLOGY MANAGEMENT**

Putting resources into the correct technologies over the lifecycle of items and organizations places incredible requests on management and choice procedures. Our research here expects to assist supervisors with bits of knowledge into technology arranging, understanding technology patterns and leaps forward, sourcing technologies and evaluating their incentive to the business. Reasonable importance is underscored through an attention on management procedures and devices, supported by well-established theoretical systems.

#### **Management Tools for Decision Support**

Investigating the advancement and utilization of organized techniques to accumulate, investigate compose and convey the data vital for basic leadership and management.

#### **Beginning period Technology procurement and insurance**

Coordinating basic variables related with the obtaining of beginning period technologies into a choice help instrument.

#### **Street mapping**

The street mapping technique has been a progressing region of research movement, creating supporting hypothesis and structures, and useful workshop-based strategies for the quick inception of street mapping inside firms and at the area level.

#### **Modern development**

This venture has utilized mapping procedures to recognize the examples, empowering influences and hindrances related with the recorded rise of technology-serious businesses to build up a lot of devices for supporting key arranging.



## **Make or purchase**

Components to think about when making technology (and other) were sourcing choices.

## **Technology insight**

The nature of a technology procedure is generally subject to the nature of the information and data accessible. A system for technology knowledge has been created, including handy direction, and the job of middle people has been investigated, especially with regards to open development.

## **Technology assessment and showcasing**

Comprehension and conveying the potential estimation of a technology is a key test those worried about overseeing R&D. A procedure manage has been created to help the examination and advertising of technology in business.

## **1.7 TECHNOLOGY MANAGEMENT**

Technology management is a lot of management teaches that enables associations to deal with their innovative basics to make upper hand. Run of the mill ideas utilized in technology management are:

- Technology procedure (a rationale or job of technology in association),
- Technology determining (ID of conceivable pertinent technologies for the association, potentially through technology exploring),
- Technology guide (mapping technologies to business and market needs), and
- Technology venture portfolio (a lot of tasks being worked on) and technology portfolio (a lot of technologies being used).

The job of the technology management work in an association is to comprehend the estimation of certain technology for the association. Constant improvement of technology is significant as long as there is an incentive for the client and accordingly the technology management work in an association ought to have the option to contend when to contribute on technology advancement and when to pull back.

Technology management can likewise be characterized as the coordinated arranging, structure, streamlining, activity and control of innovative items, procedures and

administrations, a superior definition would be the management of the utilization of technology for human bit of leeway.

The Association of Technology, Management, and Applied Engineering characterizes technology management as the field worried about the supervision of staff over the specialized range and a wide assortment of complex innovative frameworks. Technology management programs ordinarily remember guidance for generation and activities management, venture management, PC applications, quality control, security and medical problems, insights, and general management standards.

Maybe the most definitive contribution to our comprehension of technology is the dispersion of advancements hypothesis created in the main portion of the twentieth century. It proposes that all developments pursue a comparative dispersion design most popular today as an "s" bend however initially dependent on the idea of a standard circulation of adopters. In expansive terms the "s" bend proposes four periods of a technology life cycle developing, development, develop and maturing.

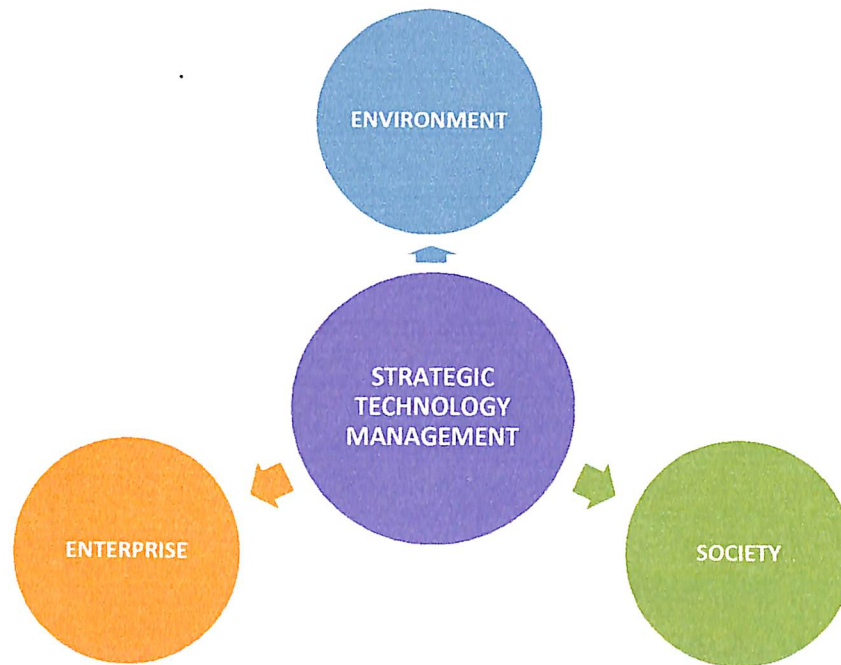
These four stages are coupled to expanding levels of acknowledgment of a development or, for our situation another technology. As of late for some technologies a reverse bend which compares to a declining cost for each unit has been hypothesized. This may not demonstrate to be all around evident however for data technology where a significant part of the expense is in the underlying stage it has been a sensible desire.

The second significant commitment to this region is the Carnegie Mellon Capability Maturity Model. This model suggests that a progression of dynamic abilities can be measured through a lot of edge tests. These tests decide repeatability, definition, management and enhancement. The model proposes that any association needs to ace one level before having the option to continue to the following.

The third noteworthy commitment originates from Gartner – the research administration, it is the Hype cycle, and this proposes our cutting edge way to deal with promoting technology brings about the technology being over advertised in the beginning periods of development. Taken together, these crucial ideas give an establishment to formalizing the way to deal with overseeing technology.

## 1.8 STRATEGIC MANAGEMENT

Traditionally, key management is characterized as "assurance of the essential, long haul objectives and targets of an undertaking and the selection of approaches and the distribution of assets fundamental for those objectives". Vital management is worried about the organization's drives taken by the management, to make, upgrade and support its capacities with respect to its condition, and to arrive at the organization's destinations.



Originations on what is system and vital management have advanced and divided throughout the years, among vital management researchers, the understood agreement definition for key management is: "The field of key management manages the major expected and new activities taken by senior supervisors, for the benefit of proprietors including usage of assets, to upgrade the presentation of firms in their outside surroundings". The definition covers unequivocally parts of condition, society, venture; association, management, individuals; information, results, and worth creation, which all have reflection to the setting of the structure for key technology management.

Vital technology management endeavors to address technology related issues contained in the field of key management. In the extent of key management, recognize seven research subjects and main regimens disciplines for technology management: procedure and technology; national technology management frameworks; wellsprings of aggressive methodology; assembling, activities and new item improvement; information management; creations and licenses management; life-cycles and discontinuities. In this exposition, the intrigue point is

in connecting methodology and technology by methods for key technology management inside vital management of an undertaking.

### **1.9 TECHNOLOGY STRATEGY**

Technology must be associated with the company's business strategy by thinking about significance and connection of technologies to the organization's conventional aggressive strategy. Additionally, technology must be associated with the company's strategy on items, administrations and procedures all through its worth chain exercises.

So as to adequately respond into innovative changes, an organization must be fit for evaluating elements of the life-cycle of the technologies it uses or plans to utilize, and perceive occasions that may lead into disturbance. Abilities and attributes of technology must be assessed, created and utilized over the organization, as indicated by its technology, item and business strategy.

Technology strategy is one of the key components in key technology management. Technology strategy fills in as the reason for business strategy and upper hand. It helps answer the inquiries, for example, which technologies, abilities and capacities are required for upper hand, which technologies are to be utilized, what ought to be the venture level on technology improvement, what is the make or purchase strategy, how to acquaint technology with the market as installed in items, and how to sort out technology advancement and technology management. The degree and significance of a technology strategy is frequently perceived in organizations, yet the presence of an express technology strategy fluctuates even in high technology organizations.

The definition and reason for technology strategy is very bound together in writing, albeit each writer has their very own flavor in the definition. The genuine substance fluctuates colossally relying upon industry, venture business setting, size and life-arrange. Technology strategy is worried about connecting technology with the association's aggressive methodologies, and this can be the premise of the general strategy. It is principal to coordinate all regions of management of mechanical development into a reasonable entirety. Technology strategy involves the definition, improvement and utilization of those mechanical skills that establish the organization's upper hand.

## CHAPTER 2

### INDUSTRY PROFILE

#### 2.1 IT IN INDIAN POWER SECTOR

Indian electricity segment has seen enormous development in its energy request, age limit, and transmission and dispersion systems. Electrical power frameworks would seem balanced for an upheaval. However, the pathway to change is profoundly delicate to every nearby circumstance and its specialized, financial, and political variables. While quick cost decreases have changed the financial scene for what is plausible, built up resource bases and their supporting plans of action and administrative structures produce huge idleness in the most power frameworks.

While the 'utility of things to come' can be to a great extent caught by the dynamic between guideline, technology advancement, and plan of action development, the 'control arrangement of things to come' is driven by a progressively perplexing arrangement of highlights. The administrative utility dynamic is as yet a prevailing segment, yet the full mind boggling and dynamic framework reacts to a more extensive arrangement of cross cutting patterns like sustainable power source cost decreases, developments in information, knowledge, and framework streamlining, energy security, unwavering quality and flexibility objectives, advancing client commitment, expanded cooperation's with different areas, nearby and worldwide ecological worries over air outflows, energy get to goals, progressively various support in control markets, income and venture difficulties.

Keeping pace with the ongoing innovative progressions, it is sending new sorts of gadgets and Information Technology (IT) foundation, embracing new checking, control and energy management instruments, and focusing on quick arrangement of keen lattice ideas at dissemination just as transmission level. Electricity, being a simultaneous subject in India, both central government and state governments are answerable for its development, activity and control. The Central Government outlines generally guidelines though each state government defines their strategies inside the general administrative system. There are discrete utilities owning age, transmission and conveyance. Service of Power, Government of India manages viewpoint arranging, arrangement definition, handling of activities for venture choices, checking and usage of intensity undertakings, preparing and labor advancement, organization and order of enactment concerning the power age, transmission and

dissemination. In most exceptional nations, control utilities have made significant gains in term of profitability, productivity, dependability and business management through its advanced utilization instruments. IT ought to be used to limit human interface in business procedures to limit human blunders and unyielding mix-ups.

IT gives wide scope of answers for increment the proficiency and efficiency of intensity division like setting up dissemination arrange appropriation load management and meter information management. However, in Indian power area, activity and dissemination forms are manual, deficient business center, insufficient control, absence of straightforwardness and solid data this outcome high misfortune to influence part. Indian power division is utilizing remain solitary framework for restricted operational prerequisites or as an instrument to take care of explicit issue without a long haul strategy. Most dissemination utilities in India are as yet ailing in most essential prerequisites for example buyers and resources databases that outcome into direct income misfortunes. Most utilities keep up manual records of shoppers as registers particularly, in rustic zones that make the total procedure tedious. Utilizing of electromechanical meters, manual perusing of meters and bill arrangement, lacking bill assortment offices bring about generally speaking deferral in income assortment and that lead to misfortunes in influence part organizations. IT is generally recognized to be pivotal for proficient activity and management of every single modern framework. This is valid for the power utilities, which need to deal with a lot of data for their productive activity.

### **IT Strategy and Plans**

An organized and far reaching IT strategy and plan will help the appropriation utilities to get the advantages from data technology. The IT strategy and plans should think about a few angles.

The IT applications have been isolated into the accompanying four classifications:

- Prerequisites – To be set up first to permit usage of ensuing IT applications
- Short-term – Quick successes
- Medium-term – High return
- Advanced applications



Brilliant Grid Vision of India: A keen framework is the coordination of data and interchanges technology into electric transmission and dispersion systems. The brilliant network conveys electricity to customers utilizing two-way computerized technology to empower the more effective management of buyers' end employments of electricity just as the more proficient utilization of the lattice to distinguish and address supply request irregular characteristics quickly and identify blames in a 'self-mending' process that improves administration quality, upgrades unwavering quality, and diminishes costs. The developing vision of the savvy matrix envelops an expansive arrangement of uses, including programming, equipment, and technologies that empower utilities to incorporate, interface with, and astutely control advancements. A portion of the empowering technologies that cause shrewd matrix arrangements conceivable to include: Meters, Storage gadgets, Distributed age, Renewable energy, Energy proficiency, Home zone systems, Demand reaction, IT and back office processing, Security, Integrated interchanges frameworks, Superconductive transmission lines.

Geographic Information System (GIS): GIS applications are many; control organizations can gather and store a lot of information that can be promptly gotten to and examined. Quality of GIS is incorporating information and setting it up for investigation or demonstrating separated from integrating information from different sources makes it a significant apparatus for the arranging and basic leadership. Client can show legend of all layers showed on the guide. This legend will be spoken to by the image of each layer with shading and the name of the layers in a rundown. Framework will show arrange of the present mouse position and the organize worth will change with the development of mouse pointer over the guide zone. Client can see co-ordinate just when the mouse pointer is inside the guide region. GIS gives a wide scope of arrangements enveloping the whole business esteem chain in the power dispersion area from setting up circulation system and burden management to client data, resources management, charging and client administrations. Computerized framework gives auspicious, exact and simpler method for getting data, which is extremely fundamental in taking brief and precise choices.

Propelled applications: The propelled applications can be assembled simply subsequent to building up a solid establishment in the previous stages. For example, versatile field power arrangement can be assembled simply in the wake of setting up a framework for management of field administration requests (and client and administration databases significantly prior). E-business arrangements, for example, client self-administration and e-acquirement require

the CIS, SCM (Supply Chain Management), and so forth., to be set up. Coordinated Billing System for Large C and I Customers, Enterprise asset arranging (ERP), Oracle ERP, SAP Utilities, SOA (Service-Oriented Architecture), AMR (Automated Meter Reading), Wireless Technologies-GSM/GPRS based and CDMA based technologies, Power Line Communication System (PLC).

Coordinated metering, charging and assortment frameworks: The goal is to incorporate charging, installment and assortment to wipe out degree for altering and control and in this manner, improve assortment. Installments are at present made face to face in the majority of the spots. Just in not many spots installments can be made on the web or through ATM. It very well may be utilized for making electronic installments including direct charge installments.

Energy bookkeeping framework to direct energy review: At present, meters are introduced at 33 kV feeders and at certain spots on 11 kV feeders. Meters are not introduced at dispersion transformers (DT) level. All out energy contribution to a circle is known precisely yet not the absolute energy sold, in view of numerous clients are unmetered. Thusly energy misfortunes at various stages are obscure. Energy bookkeeping has begun at certain spots however with incorrect information. Because of absence of data, the control is incapable and the duty can't be fixed. It is important to realize energy information and energy sold at different phases of sub-transmission and conveyance to distinguish zones of high misfortunes. Additionally, data on stacking, voltage and utilization at various levels can be utilized for organize management and decrease in blackouts. For this reason, meters with ongoing correspondence, office ought to be introduced at 33 kV feeders, 11kV feeders and 11 kV/0.4 kV DTs. Non-metered clients are to be isolated and provided control from various transformers. Guide clients to separate DT's and assemble correspondence channels to move information from the meters to the central meter perusing control framework.

Remote perusing is favored over download office through handheld gadget. It gives continuous pictures while handheld gadget can give just depictions. This data can be utilized for arrange management and in circulation robotization. Grumbling taking care of: At present, shoppers find exceptionally difficult to stop their grievances. The clients as a rule need to go to the substation for supply related grumbings and the concerned workplaces for the bill related objections. Power utilities can have call focuses with IVR for blackouts and bill related grievances.

Appropriation division: In India, dispersion business is portrayed by manual and entangled procedures, insufficient controls, absence of business center, restricted straightforwardness and absence of solid data. Therefore, the tasks are profoundly wasteful with significant income spillages and poor client direction. Its utilization has been low and in pockets. The few independent applications have restricted capacity to viably interface and incorporate with different applications or with potential applications to be conveyed in future. In spite of the fact that the degree of arrangement of IT differs fundamentally over the utilities, the key applications have been in staggered total of information or huge scale information handling. Advance nations are utilizing IT apparatuses to pick up in term of profitability, productivity, dependability and so on. It has been seen that Indian power organizations are lingering behind because of not appropriate execution of data technology. Different nations which have Aggregate Technical and Commercial misfortunes in single digit figure their IT assume central job in their business. An immense venture required to achieve worldwide standard which isn't possible at one go. Along these lines, it is expected to embrace stage approach in IT usage.

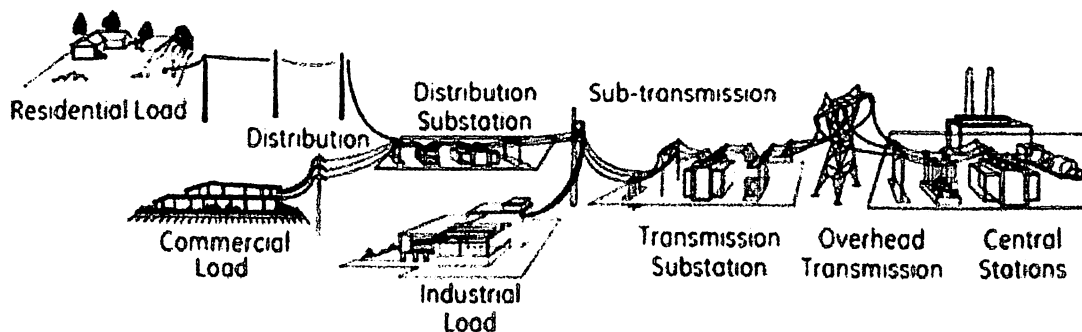
IT is one of the columns to accomplish this future effectively. For many years, utility in the created nations have been utilizing the IT for acquiring critical advantages. The Indian segment also has presented IT arrangements yet the methodology has been piece supper with independent applications sent for a restricted operational necessity. IT has been utilized uniquely as an instrument to address a particular issue or two at once without comprehensive methodology. It has prompted restricted incorporation of frameworks, underutilization of assets, nonattendance of standard database, significant expense of upkeep, insufficient interface and joining with different applications. These issues have unfavorably influenced the arrival from IT ventures. Incomprehensible technology strategy prompts circumstances where contrary alternatives are chosen and huge entireties of cash are squandered in endeavor to coordinate them. There is a lot of space for IT application inside the power area in India. There is a need to take a gander at the worldwide practices in IT selection in the power part so India can profit by them.

## 2.2 GEOGRAPHICAL INFORMATION SYSTEM

The spate of intensity changes in India has drawn spotlight on the selection a coordinated IT strategy over the circulation esteem chain to gather and set up the benchmark information for accomplishing fundamentally the accompanying targets:

- Reduction of ATC (total specialized and business) misfortunes
- Improving process proficiency via mechanizing different utility procedures
- Enhancing client administrations
- Total energy review and bookkeeping
- Improving incomes through practical plan of action

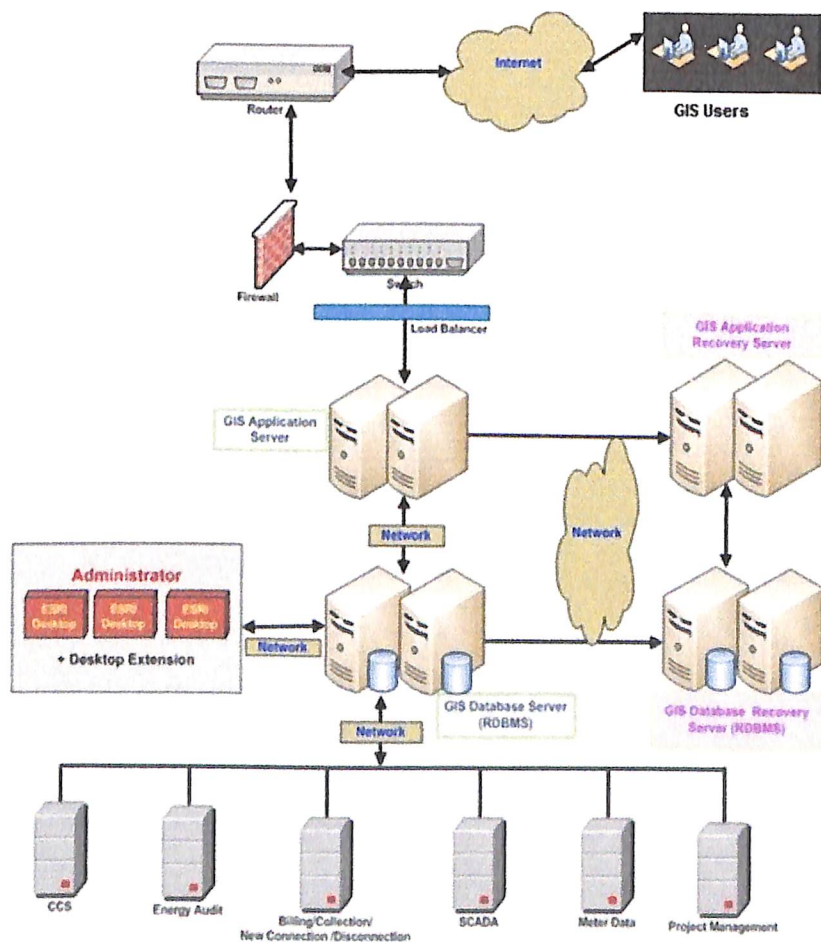
With subsidizing and specialized rules now accessible for control part changes from Power Finance Corporation, under Ministry of Power, the Indian utilities are currently grasping a gauges based way to deal with mix new technologies for big business process computerization, utilizing worldwide accepted procedures in venture execution and framework coordination. Data Technology is playing out the job of an empowering influence, driving business process changes, through procedure re-designing, computerization, limit building and framework incorporation.



GIS is being utilized for various applications like dissemination arrange mapping, shopper database ordering, organize investigation and burden stream thinks about, resource management, blackout management, energy review and client administrations. Spatial information examination is helping GIS clients to investigate designs in spatial information for MIS and Business Intelligence, with the aim to improve electrical system productivity and client administrations. DGPS overview, mapping and digitization of electrical system, shopper mapping and superimposition of the geospatial base guide with related characteristic

information on satellite symbolism is currently a standard business practice in numerous India utilities.

In any case, the primary test looked by the utilities is coordinating GIS segments with center dispersion forms like Connection management, Meter information management, Billing and Collections, Customer Services, Network investigation and Energy review. This underlines the requirement for appropriation of Service-arranged engineering (SOA) and utilizing standard middleware Enterprise Service Bus (ESB) with parameterized business rules for coordinating GIS with other utility applications. GIS-based recreation considers are assessing the effect of system reconfiguration, re-conductoring and arrange improvement. Enhancement of system structure by method for capacitor arrangement, defensive gadget coordination and system restorative activities are presently conceivable with GIS-based system investigation, subsequently encouraging burden stream studies and voltage guideline in every feeder area and taking appropriate amending activities for over-burdening and technical misfortunes.



Nonetheless, the procedure of GIS-based network mapping and customer ordering is loaded with difficulties related with geospatial data assortment from DGPS field survey and entryway to-entryway survey to set up the one of a kind electrical character of the buyers mapped to the conveyance network. Ground truth check and post-preparing of geospatial data now and then require different visits to the site and data re-assortment. Frequently the heritage data on electrical network like single-line graphs and resource traits are neither appropriately archived nor effectively accessible with the Utility.

The distinguishing proof names on electrical resources are once in a while not neat or not accessible by any stretch of the imagination. The framework integrator (SI) must choose the option to depend without anyone else ground data assortment and confirmation with the concerned utility staff. Likewise when new electrical resources are introduced on the network, the utility is required to give subtleties quickly to SI to undertaking DGPS survey, as this has significant reliance on the courses of events for consummation. There might be where resources previously surveyed may require trade for operational reasons. In such cases, new ascribe must be gathered and refreshed in the database. This requires facilitated exertion between the Utility and SI. A change demand must be started by the utility, according to change management control methods.

### **Network Analysis**

New procedures are presently accessible to furnish graphical investigation of dissemination network with schematics featuring trait data for substation, associated feeders, DTs, circuit breakers, sectionalizes, auto-recloses and capacitor positions. The network investigation methods utilize propelled calculations for figuring stage irregular characteristics, recognizing low-voltage or over-burden areas, ascertaining segment savvy misfortune levels and applying framework advancement through network reconfiguration, shunt capacitor positions and arrangement remuneration. Be that as it may, since network investigation process benefits from constant data, it represents a major test to the Utility, because of an incessant absence of prepared labor, guaranteeing opportune updating of network data at ordinary interims.

### **Energy Audit**

The approach of new technologies permits the Energy review module to be flawlessly coordinated with metering, charging and assortment with negligible manual mediation. The module needs to catch electrical network data, meter data and energy parameters for Feeder-



wise and DT-wise misfortune count and further investigation to distinguish segments causing income spillages. In this way, 100% metering of shoppers, substation feeders and conveyance transformers is a significant worry for all out energy bookkeeping. To execute consistent incorporation of the whole business forms with both the new frameworks and current inheritance frameworks is viewed as a significant test, except if the utility decides to dispose of the old frameworks totally. Another test is the heritage data movement, which requires purifying, approving and changing the inheritance data in the necessary configuration perfect with the new frameworks.

### **Client Care Center**

This is of key significance from the perspective of giving client benefits and guaranteeing statutory consistence for giving new electrical associations, keeping up network activities and preparing buyer protests in regards to electricity supply, establishment and charging. Each utility needs to maintain the gauges of execution (SOP) as far as quality and time for conveying client administrations, as endorsed by the State Electricity Regulatory Commission (SERC). The point is to saddle technology to make client benefits increasingly straightforward and speedier. Web Self Services (WSS) is a device to give clients an easy to use interface to deliver their issues identified with electricity supply and administrations. Both CCC and WSS have different intertrifaces with the utility's business procedures, for example, client data framework, resource management, upkeep management, network examination and charging framework. Consistent reconciliation is a mammoth exercise to guarantee business exchanges and data trade crosswise over modules, preparing and breaking down data, taking care of special cases and accelerations and creating reports, inside the adequate time limit for client administrations.

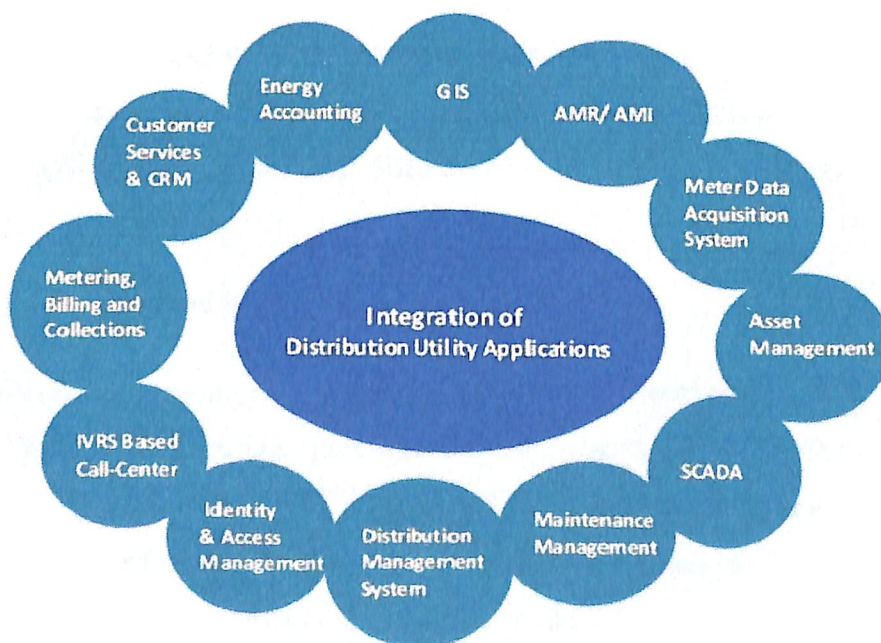
### **Data Extraction and Migration**

Reception of new technology and heritage data movement to the new framework is an escalated exercise. Movement of inheritance data from the current framework to the new framework is one of significant difficulties of business process changes. The inheritance data of purchasers, resources, charging and assortments have be extricated, scrubbed, defended, changed and accommodated. A few cycles of counterfeit transformations according to the data model must be run and tried before legitimate movement. The test of data extraction, change, movement and mix with new applications can be dodged with a proactive methodology and dynamic collaboration from the Utility space specialists.

## Undertaking Application Integration

There is an extraordinary time strain to finish the GIS survey for data assortment, handling and mapping of geospatial data of electrical network resources and shoppers, lastly incorporating with utility uses of Customer Services, MBC, AM/MM, EA and Network Analysis. Coordinating AMR data and creating APIs and modules for various makes and models of energy meters – each with their very own exclusive conventions – on a typical Utility charging motor stances tremendous difficulties. There is a principal prerequisite of an appropriate energy review and bookkeeping framework via mechanizing the dispersion esteem chain on "meter-to-money" idea. An elevated level of incorporation is required utilizing empowering technologies and web administrations for convenient and precisely recording, preparing and mining of client and meter data, business data and resources data.

To empower consistent joining of the whole business forms, the Utilities in India are depending on Service-arranged engineering (SOA) and configurable Middleware stage, in view of open-standard Enterprise Service Bus (ESB). The procedure reconciliation arrangement is intended for multi-level, online execution on parametric, rule-based motor. For instance, the joining of different programming modules like ERP, GIS and MDAS is actualized through standard modules or APIs. Between operability and data trade benchmarks like WSDL, UDDI, XML and SOAP encourages the incorporation procedure.



### **2.3 CHALLENGE OF ELECTRICITY DISTRIBUTION**

The government of India has underscored that an effective, flexible, and monetarily hearty power segment is fundamental for development and neediness decrease. Practically all speculation atmosphere surveys point to poor accessibility and nature of intensity as basic imperatives to business and assembling action and national aggressiveness. Further, in excess of 300 million Indians live without electricity, and those with control must adapt to questionable inventory, highlighting immense unsatisfied interest and confined customer welfare. This report audits the development of the Indian power division since the milestone Electricity Act of 2003, with an attention on circulation as key to the exhibition and reasonability of the area. While each of the three portions of the power division age, transmission, and circulation are significant, incomes start with the client at dispersion, so trashy execution there harms the whole worth chain. Diligent operational and budgetary inadequacies in dissemination have more than once prompted central bailouts for the entire part, despite the fact that power is a "simultaneous subject under the Indian constitution and appropriation is on the whole under state control. Forebodingly, the ongoing sharp increment in private venture and market getting implies control division troubles are bound to overflow to loan specialists and influence the more extensive budgetary segment. Government-started change endeavors initially centered on the age and transmission fragments, mirroring the earnest requirement for including limit and emptying it and the multifaceted nature of issues to be tended to at the purchaser interface.

Thusly, dispersion enhancements have slacked, yet it is currently certain that they should be a need. This report along these lines breaks down the numerous wellsprings of shortcoming in dissemination and recognizes the key difficulties to improving execution in the short and medium term.

### **2.4 EVOLUTION OF POLICIES AND INSTITUTIONS**

India executed clearing monetary changes in 1991 after a weakening parity of-installments emergency. The state-ruled power part was wasteful, hamstrung by under maintenance and lacking venture. The area had been coordinated to supply control beneath the expense of creation to key purchaser gatherings, at a tremendous money related misfortune. Furthermore, with just 70,000 megawatts (MW) introduced; it was shy of age limit. With enormous increases to limit expected to help development, private division cooperation was viewed as a vital supplement to open venture. Alterations in 1991 to the Electricity Supply Act opened

the division to private support in age. As the nation kept on confronting devastating force deficiencies, states rebuilt their vertically incorporated state electricity sheets (SEBs) and set up state electricity administrative commissions (SERCs) under their very own change authoritative activities to improve execution. The Electricity Regulatory Commission Act of 1998 set up the Central Electricity Regulatory Commission and carried administrative consistency to the states.

Be that as it may, the business execution of state utilities kept on falling apart, with misfortunes mounting to Rs 250 billion (\$6 billion, or 1.5 percent of total national output or GDP) in 2001/02. By 2002, 10 years after the opening of the part, complete SEB obligation to central open power providers had ascended to Rs 400 billion (\$8.5 billion), undermining their budgetary dissolvability and bringing about a central bailout of the state control utilities.

The EA 2003, reacting to these improvements, was planned as a forward looking, ace focused arrangement and institutional structure for building up the power area. Overriding current enactment, it delicensed warm age, set timetables for open access to transmission and dispersion giving decision to control procurers and end-clients—and presented control exchanging as an authorized movement to cultivate rivalry and energize private part section into age and transmission. The EA commanded unbundling and corporatizing the SEBs, alongside building up free central and state controllers and the Appellate Tribunal, with the point of making a progressively responsible and business execution culture. Auxiliary strategies that pursued laid the basis for aggressive mass obtainment of intensity, multiyear duty structures, country zap, and sustainable power source extension.

## **2.5 IMPRESSIVE ACHIEVEMENTS IN MANY DIMENSIONS**

Supported by a sound arrangement structure and a great monetary condition, the division has taken mammoth walks on numerous fronts. Age limit significantly increased somewhere in the range of 1991 and 2012, bringing introduced ability to 214 gigawatts (GW), supported by a flood in the offer contributed by the private segment, which expanded from 3 percent to 29 percent. Sustainable power source age limit, both framework and off-network, expanded forcefully in light of government motivating forces, for example, feed-in levies on the age end and inexhaustible buy commitments on the conveyance end, just as sustainable power source declarations that have advanced exchange renewables. From 18 MW in 1990, matrix sustainable power source limit rose to 25,856 MW in March 2013, or 12 percent of complete limit; off-network inexhaustible limit remains at 825 MW.

By perceiving exchanging as an authorized action; opening section into age; allowing numerous dissemination licensees; presenting a "savvy" transmission levy to calm network clog through purpose of-association evaluating; isolating transmission from dispatch, exchanging, and age; and advancing open access, the EA has prompted a functioning force market and power trades that have facilitated the passage of dormant (hostage) limit into the market. The move from arranged updates of comprehension with ensured paces of come back to financial specialists to advertise driven aggressive acquirement delivered a colossal private reaction in age and low tax offers (however late experience demonstrates that distributing fuel-value hazard to bidders may have been unreasonable and is currently being balanced). Accordingly, the move from feed-in taxes to switch barters supported the extension of sun oriented limit from 17.8 MW in 2010 to 1,440 MW in 2013; aggressive offering for ventures under the National Solar Mission drove down costs for framework associated sun based energy to as low as Rs 7.49 (\$0.15) per kilowatt-hour (kWh). A state-of-the-craftsmanship coordinated transmission matrix that can adjust request and burden streams the nation over has been acknowledged with the ongoing association of the southern lattice, all of India is currently synchronously associated in a solitary framework.

While accomplishments in dispersion have been less broad than those in age and transmission, a significant achievement has been the sharp increment in access to electricity. On the rear of an aspiring central plan, the Rajiv Gandhi GrameenVidyutikaranYojana (RGGVY), access to electricity rose from 59 percent of the populace in 2000 to 74 percent in 2010.

Promising models to get efficiencies from private interest in circulation have been grown however should be scaled up for sway. Universally, private interest has for quite some time been viewed as a viable method for settling proficiency issues in appropriation. In India the "heritage" private conveyance utilities in Kolkata, Mumbai, Surat, and Ahmedabad, with their great productivity and client assistance, are evident instances of the potential increases from private investment.

They motivated the open private joint endeavors in control circulation taken forward first in Orissa, with restricted effect, at that point in (gaining from Orissa's understanding), with more noteworthy achievement. Perceiving the constrained political space for such "privatization," the EA 2003 built up the idea of "circulation establishments." With the

accomplishment of the Bhiwandi establishment activity in Maharashtra, which exhibited the impressive efficiencies and decrease in misfortunes that could be accomplished, private investment through the establishment course is today being investigated in Bihar, Madhya Pradesh, Maharashtra, and Uttar Pradesh. A push toward rustic establishments has likewise happened, to help state utilities oversee (metering, charging, assortment, and activity and upkeep) low-pay and low-utilization country appropriation networks, which have extended under the RGGVY program.

## **2.6 ADDRESSING DISTRIBUTION PERFORMANCE PRIORITY**

In spite of extensive advancement in actualizing the EA orders and related arrangements over the previous decade, the dissemination fragment keeps on posting huge misfortunes. Utility accounts basic to acknowledging division objectives weakened strongly more than 2003–11. Power segment after-charge misfortunes, barring state government support (appropriations) to the part, were Rs 618 billion (\$14 billion) in 2011, proportional to about 17 percent of India's gross monetary deficiency and around 0.7 percent of GDP. These misfortunes are overwhelmingly thought among circulation organizations (discoms) in the unbundled states and among SEBs and influence offices in the states that have not unbundled. When subsidies are incorporated as income, misfortunes fall by the greater part, to Rs 295 billion (\$6.5 billion).

Six states revealed benefits in 2011, however just three would have announced a benefit barring sponsorships: Kerala, and West Bengal. Totaling benefits and misfortunes after some time, sectorwide amassed misfortunes remained at Rs 1,146 billion (\$25 billion) in 2011, more than twice (in genuine terms) the sum in 2003.<sup>4</sup> Accumulated misfortunes developed at a compound yearly development pace of 9 percent in genuine terms from 2003, however the portion of misfortunes comparative with GDP stayed stable at about 1.3 percent, to a great extent on the grounds that the economy additionally developed emphatically over this period. Discoms and packaged utilities (SEBs and power offices) are, by and by, the biggest supporters of amassed misfortunes; however their offer has changed from 90 percent in 2003 down to 79 percent in 2008 and back up to 86 percent in 2011.

Division misfortunes have been financed by overwhelming acquiring by all part sections, with all out obligation developing to Rs 3.5 trillion (\$77 billion) in 2011, or 5 percent of GDP. Discoms are liable for the biggest portion of this obligation (36 percent in 2011), trailed by age organizations, including autonomous power makers. Numerous discoms have



depended on transient credits to meet working costs lately: long haul advances declined from 87 percent of all out division getting in 2007 to 77 percent in 2011. The intrigue trouble on utilities from transient obtaining is burdensome, with obligation overwhelming capital structures getting increasingly normal.

Mounting obligation and proceeding with misfortunes have prompted a sharp decrease in discom financial soundness. In Uttar Pradesh, Rajasthan, Meghalaya, and Haryana, control segment obligation surpassed 10 percent of state GDP in 2011. Confronting the possibility of immense and expanding nonperforming resources and moving toward their segment introduction limits, banks pulled the fitting on misfortune making utilities by late 2011. As credit evaporated, these discoms were not able compensation for control buys, with a thump on impact on upstream (age) financial specialist conclusion. The nonappearance of elective purchasers for control experiences spelled difficulty for control age organizations, which are excessively subject to state discoms as clients. This, thus, has eased back interest in age, bringing about troubles in that section also, as noteworthy assets are secured up deferred or retired age ventures.

In this manner, toward the finish of 2011, only 10 years subsequent to being rescued, the part was searching for salvage from the inside, multiple times bigger than previously. The 2011 emergency was not quite the same as that in 2001 in light of the fact that this time players from outside the power segment and government were included. Loaning by banks and budgetary organizations (to all division portions) has depended on the semi assurance of state governments despite the known bankruptcy of discoms, the off-taker and wellspring of incomes for the whole segment. In 2011 about a large portion of the area's obtaining originated from business banks. Extra sums were loaned at concessional rates by money related foundations, for example, the Power Finance Corporation (PFC), Rural Electrification Corporation (REC), and Infrastructure Development Finance Company, to bring the absolute commitment of business banks and budgetary establishments to 86 percent of influence division obtaining. The progression of liquidity restricted the weight on discoms to improve execution and on state governments to allow levy increments. (It was uniquely in 2011 when banks were coordinated to quit loaning to indebted utilities that states pushed through tax increments.

## 2.7 OPERATIONAL AND FINANCIAL PERFORMANCE OF DISTRIBUTION

Total technical and business (AT&C) misfortunes, which measure utility operational and budgetary execution, have tumbled from 38 percent to (a stillhigh) 26 percent more than 2003–11. AT&C misfortunes comprise of dispersion misfortunes, which involve misfortunes because of both technical and nontechnical elements, and misfortunes from assortment wastefulness. Conveyance misfortunes have dropped from 32 percent in 2003 to around 21 percent by and large in 2011 in this way, in spite of the empowering pattern, utilities still have not been paid for in excess of a fifth of influence they acquired and provided. In 2011 the most minimal appropriation misfortunes were in Kerala, at around 12 percent, like universal best practice.

To comprehend the general commitment of various variables, appropriation utility income losses<sup>10</sup> can be decayed by source: from undervaluing (normal charged duties beneath cost-recuperation tax levels), from under assortment (not gathering everything charged), and from physical misfortunes of energy (misfortunes above universal standards because of technical reasons or because of nontechnical elements, for example, burglary). In 2011 the outright sum lost was most elevated in TamilNadu, trailed by Rajasthan and Andhra Pradesh; misfortunes in five states were in excess of 100 percent of dissemination incomes earned.

Assortment productivity has commonly stayed steady, ascending from 89 percent in 2003 to 94 percent in 2011.<sup>11</sup> most states are over 90 percent, however execution declined in about a large portion of the states more than 2003–11. The time taken to gather installments borrower days is another operational wastefulness that has contributed, through the assortment rate, to the poor monetary presentation of appropriation utilities. Normal account holder days have descended from 213 days to around 170 more than 2003–11 with the 10 best entertainers averaging 21 days in 2011 however the 10 most exceedingly terrible 489 days, demonstrating gross mismanagement of income.

In 2003, in total, states were charging a normal charged tariff<sup>12</sup> well above cost recovery, 13 and misfortunes that year were overwhelmingly determined by circulation misfortunes that is, over the typical physical misfortunes of energy. Paradoxically, in 2011, in total, states were charging a normal charged levy beneath cost recuperation. Therefore, undervaluing developed as a significant supporter of misfortunes, however conveyance wasteful aspects, while littler than in 2003, kept on being the biggest supporter of complete misfortunes.

Determined over all states, the edge of cost recuperation declined more than 2003–11 since tax builds neglected to keep pace with cost increments. In spite of the fact that the normal charged levy in 2011 was higher than cost recuperation in 15 states, technical misfortunes, robbery, and under-assortment can (and frequently do) prompt no income from a lot of influence provided by utilities. The way that most utilities still make misfortunes regardless of having taxes at or above cost-recuperation levels strengthens how much operational wasteful aspects add to utility misfortunes. Just, Kerala, and West Bengal had levies that took care of expenses in 2011 and made a benefit without requiring a sponsorship.

## **2.8 FINANCIAL DIFFICULTIES**

On the cost side, unanticipated deficiencies of fuel (mostly coal) and lack of foresight by discoms have prompted a precarious ascent in the cost of mass power the fundamental explanation behind the enlarging hole between discom expenses and incomes. While normal income developed at a genuine compound yearly development pace of 6 percent more than 2003–11, the normal expense of supply rose at around 7 percent, developing by 70 percent in genuine terms over the period. The portion of intensity buys in all out costs rose from 56 percent in 2003 to 74 percent in 2011. Power has become increasingly costly as a result of a decrease in residential fuel accessibility, bringing about an intense increment in the cost of fuel utilized in age, and due to poor acquirement arranging by discoms, which prompts a minute ago acquisition of capacity to supply end-buyers.

Such buys must be obtained from the spot market and will in general be more costly than control contracted for longer periods. A sharp increment in the utilization of imported coal, which is regularly a few times as costly as household coal, and power makers' expanded utilization of e-barters (commonly costly) to buy coal have additionally pushed up the expense of intensity age. Rising premium costs, driven by discoms' expanded obtaining to meet income needs (frequently because of insufficient corrections in duties), have likewise added to heightening expenses. The acceleration in cost is additionally not generally allowed to be a go through, including to the weight discoms.

Wasteful aspects and absence of coordination among the services and organizations dependable have brought about coal creation and supply well beneath projections. Around 76 percent of the coal expended in India is utilized by the power segment, and 58 percent of electricity produced originates from coal. Coal India's imposing business model on coal creation and deals, combined with its wastefulness, has prompted predictable shortages in

coal accessibility against authentic gauges in the course of the last two Five-Year Plans (2002–07 and 2007–12). Focuses for coal creation have been excessively hopeful considering the volume of investigation embraced in before years.

Poor coordination among the various offices that need to give clearances has added long deferrals to mine advancement. Foundation for clearing of coal created has not stayed aware of generation, either. The hole between the measure of coal required (for plants granted coal linkages and to be dispatched during the Plan time frame) and the real increment in coal generation, especially more than 2010–12, focuses to a critical requirement for harmonization between the concerned services. Actually, an extensive volume of interest in warm power plants, with control buy understandings (PPAs) in light of the anticipated accessibility of modest, residential coal, is currently liable to stay stranded.

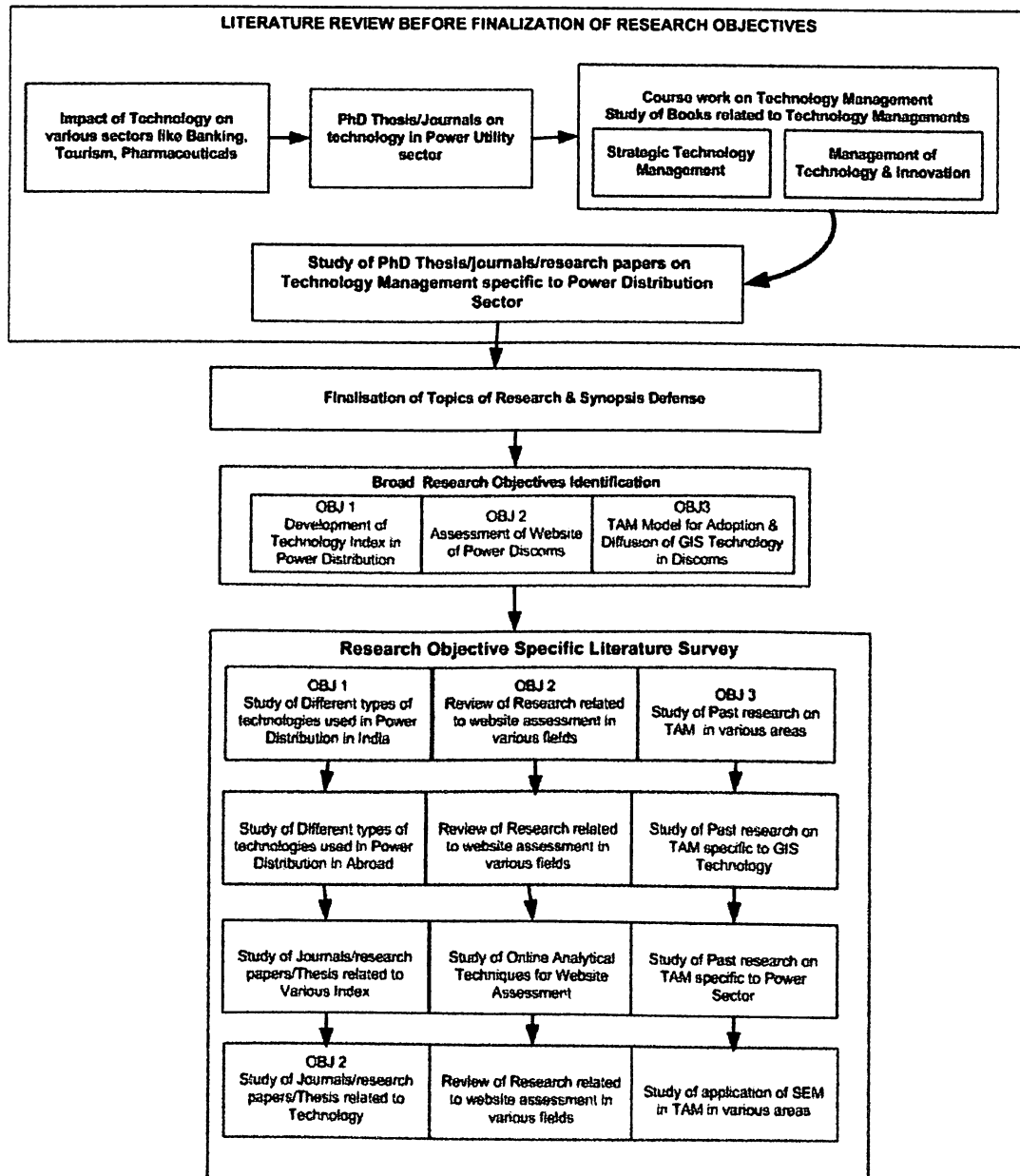
The issue for utility accounts emerges on the grounds that there is frequently a hole between the volume of endowments booked by utilities as pay and the sum got from the government. This intensifies the financial aspects of previously battling utilities, undermining their reliability and keeping them from contributing to improve administration conveyance. The hole was Rs 119 billion (\$2.6 billion) for all states in 2011. Since 2003 endowments booked have grown 12 percent a year and sponsorships got by 7 percent a year; the combined hole between them was \$10 billion for 2003–11.

## CHAPTER 3

### LITERATURE REVIEW

The literature on various aspects of the research topic would be reviewed, as per the Literature Survey process, depicted in the following figure:

#### Literature Survey Process



**Figure 3.1.1: Literature Survey Process adopted for this research**

### 3.1 TECHNOLOGIES FOR DISCOMS IN NCR

M P Gupta (2007) et al exactly surveyed its degree use in government associations, and research the job of top management, IT management, client fulfillment, hierarchical culture, and IT use through spellbinding and inferential insights.

MeetaDasgupta (2011) attempted to unite various parts of mechanical advancement and technology strategy at North Power Ltd, which has taken different activities to turnaround the weather beaten power dissemination industry in India It subtleties the different innovative activities taken by the organization to patch up the power conveyance circumstance of the nation.

Hiroshi Kashiwazaki et.al (2002) explains New Technologies for Electric Power Distribution Systems, the keen substations applying IT (data technology) and system arrangements focused on fast correspondence., with the consolidation of requirements for the future shrewd control of substations, security, observing, and correspondence systems that have favorable circumstances as far as superior, utilitarian conveyance, data sharing and coordinated power appropriation management.

Kam-Hoong Cheong in his proposal on IT Strategy for utilities did broad research on existing IT systems inside electric utilities, for the most part planned with the customary attitude of the modern age that concentrated fundamentally on technology, is deficient and ineffectual in managing the present IT which has a more extensive ramifications on an association's business exercises. So as to upgrade the viability of future IT strategy, a structure that receives a system approach is proposed in this proposition.

P.V.ChopadeB.E.Kushare Dr. D.G.Bharadwaj talks about Information Technology Solution for Power Distribution System Automation, gave IT arrangement which will empower the business activity at the exchange level and improve the general quality in Decision Support System. Data Technology (IT) would along these lines become the establishment for reasonable changes.

R. P. Gupta and S. C. Srivastava (2007) portrayed the indigenous advancement and usage of a Power Distribution Automation system at pilot level in Indian Institute of Technology (IIT) Kanpur, India. Electric Power Distribution Automation (DA) system is as a rule progressively received by the electric utilities to lessen the operational issues of dispersion networks.

AurobindaBasu, Surajit Banerjee, GautamBanerjee(2006) centers around Reduction in T&D Losses in CESC by IT put together Surveillance centers with respect to different IT based activities which had prompted decrease of T&D misfortunes in Kolkata.

K V Ravithran (1999) discusses the, Power system of Kerala techno monetary examination, investigations the patterns in market interest variable influencing the power system and power system productivity of the state as far as burden factor, request factor transmission and conveyance network and levy structure.

Joined Energy (2013), a Victorian power dissemination Company in Melbourne, in its Distribution yearly Planning Report, expounds the organization strategy in viable usage of different technologies like GIS, SAP, SCADA, and AMI and so on for better administrations to the clients and expanding effectiveness of the association.

Robinson (2013) has successfully attempts to gives the short thought with respect to the effect of electricity on monetary status of individuals in and viability of Electricity Regulatory Commission (DERC) guideline for yearly/multiyear levy rates computation.

### **3.2 PERFORMANCE OF INDIAN POWER SECTOR**

#### **Power Sector in General**

Among the various models of activity accessible, Transmission System Operator model was proposed by Singh and Srivastava (2004), which will therefore empower activity just as the responsibility for lattice to be coordinated into a solitary unit liable for transmission network improvement subsequently offering indiscriminate open access of power to all market members. The research of Khurana and Banerjee (2015) concentrated on effectiveness and profitability of different fragments of power area esteem chain with respect to monetary and operational execution and built up an exhibition file utilizing Analytical Hierarchy Process (AHP1) technique. Yadav et al. (2009) played out a between nation near execution assessment of 19 creating nations including India and demonstrated that India positioned seventh out of 19 nations examined, and the outcomes featured the requirement for good management rehearses. Malik et al. (2012) analyzed the effect and activity productivity due to unbundling of age fragment, and the aftereffects of the research demonstrated that

unbundling of organizations lead to progress of plant accessibility by around 4.6% and diminished constrained blackouts by around 2.9%.

### **Age Segment**

Shanmugam and Kulshreshtha (2015) estimated technical effectiveness of warm power plants utilizing the SFA2 procedure and demonstrated that western district is increasingly proficient when contrasted and another locale. The lady research on warm power plants in India's Power division utilizing DEA3 was made by Nag (2006). As far as profitability, Behera et al. (2011) examined warm power plants concentrating on the effect of profitability because of limit expansion. While, Shrivastava et al. (2012) examined the issue of deficiency of accessible limit because of deficient creating limit increments In execution productivity assessment utilizing DEA procedure for Indian power segment, the idea of maintainability and environmental change alleviation goals was first talked about by Vazhayil and Balasubramanian (2012). Singh et al. (2013) received DEA based MPI4 way to deal with research the profitability change in Indian coal-terminated electricity age to evaluate complete factor efficiency (TFP). A near research of the presentation of private and open age organizations in India, the first of its sort in quite a while, was performed by Vyas (2015). In hydropower age section, the main recognized research was of Thakur and Jain (2009) who assessed the effectiveness of 34 hydropower plants and distinguished barely any wasteful power plants for development.

### **Appropriation Segment**

Thakur (2005) made the lady research to survey the presentation of utilities and benchmark in the setting utilizing DEA approach. For a similar example utilities, Thakur (2006) made one increasingly lady research on efficiency examination of stateoperated electric utilities by figuring MPI. Further to that, Meenakumari et al. (2010) considered the efficiency improvement of state-claimed utilities and recognized that lone 60% of the utilities have profitability development. In another all-encompassing research, Meenakumari and Kamaraj (2008) embraced relationship and relapse investigation, the first of its sort in Quite a while, to look at the isotonicity of the factors under research, through which just decidedly associated information and yield factors are chosen for the research. Likewise, Jain et al. (2010) contemplated utilities as for cost parameters including tasks and upkeep, authoritative and general expense as information parameters for estimating execution effectiveness and recommended for unbundling of utilities for better execution. Yadav et al. (2013)



contemplated the dispersion organizations of Uttarakhand with thought on the landscape of the appropriation territories and performed affectability investigation utilizing unwavering quality files and recommended rebuilding as a potential answer for execution improvement. Pargal and Banerjee (2014) examined the considerable mounting misfortunes in PDUs and assessed that the misfortunes comprised about 17% of India's gross financial deficiency and 1 percent of GDP.

Saxena et al. (2015) made the lady research on National Stock Exchange (NSE) recorded organizations in Oil, Gas and Power segment and endeavored to benchmark wasteful units and targets were proposed to improve execution productivity of 24 recorded organizations. A progressively thorough exhibition assessment Integrated Rating procedure (IRM) was presented by Ministry of Power in 2013. It fills in as a component for boosting or dis-boosting the PDUs to improve by and large operational and budgetary execution. The technique covers numerous parameters delegated operational, changes, administrative and money related (MoP, 2017).

### **3.3 RESEARCH WORK RELATED TO WEBSITE ASSESSMENT**

Numerous examinations have been endeavored to assess the websites (Nielsen, 2000; Alexander and Tate, 1999; Bauer and Scharl, 2000). These investigations measure the nature of website based on certain parameter like data content, route, structure, general look and feel, ease of use, security and criticalness of the data. A few techniques and apparatuses are additionally really taking shape to empower the procedure of website appraisal.

According to Wang et al. (2005) the estimations utilized for assessment of websites and furthermore perceive the reasons answerable for watched achievement or disappointment of a website. A few examinations additionally endeavored to get to websites for differing divisions, for example, online business websites (Oppenheim and Ward, 2006; Basu, 2002; Huang et al., 2006, Kumar and Sareen, 2010), scholastic and e-learning websites (Olsina et al., 1999; Buenadicha et al. 2001, Bu'yu'ko'zkan et al., 2007) and social insurance administrations sites (Bilsel et al., 2006 Welch and Pandey, 2007;). There have been a couple of exercises that concentrated on structure for evaluation of e-Government site also (Middleton, 2007, Miranda et. al., 2009).

Miranda, F.J, Cortés R and Barriuso C. (2006) assess the Spanish private and sparing banks dependent on different parameters which were utilized for the research. Francisco Javier

Miranda et al (2010) survey the job of web and assessment of websites of the European football clubs. The research concentrated on the improvement of website evaluation record dependent on parameters like availability, speed, simplicity of route and substance.

P.H. Hsieh, C.S. Huang et al (2013) exhibits the proficiency and adequacy of Taiwan's governmental web administrations. JieWu, Dong Guo (2015) exhibited execution estimation of websites of the common government of China. The research displayed distinction improvement of the region clearly affects e-government effectiveness.

### **3.4 POWER DISTRIBUTION TECHNOLOGY IMPLEMENTATION**

Requirement for Qualitative Research for example Grounded Theory for Power Distribution Technology Index

In perspective on the provokes looked to get an extensive point of view of the different features of technology usage in power Discom, the researcher utilized a blend of surveys utilizing an organized polls alongside grounded theory as one of the qualitative strategies for research. The researcher made utilize different grounded theory data assortment techniques like meetings, perceptions, archives and authentic records to get to the degree of technology execution, which would have been hard to catch through survey polls .

The segment underneath portrays:

- A short Introduction to Grounded Theory
- Phases of Grounded Theory Research.
- Grounded Theory has been utilized in research

Grounded Theory

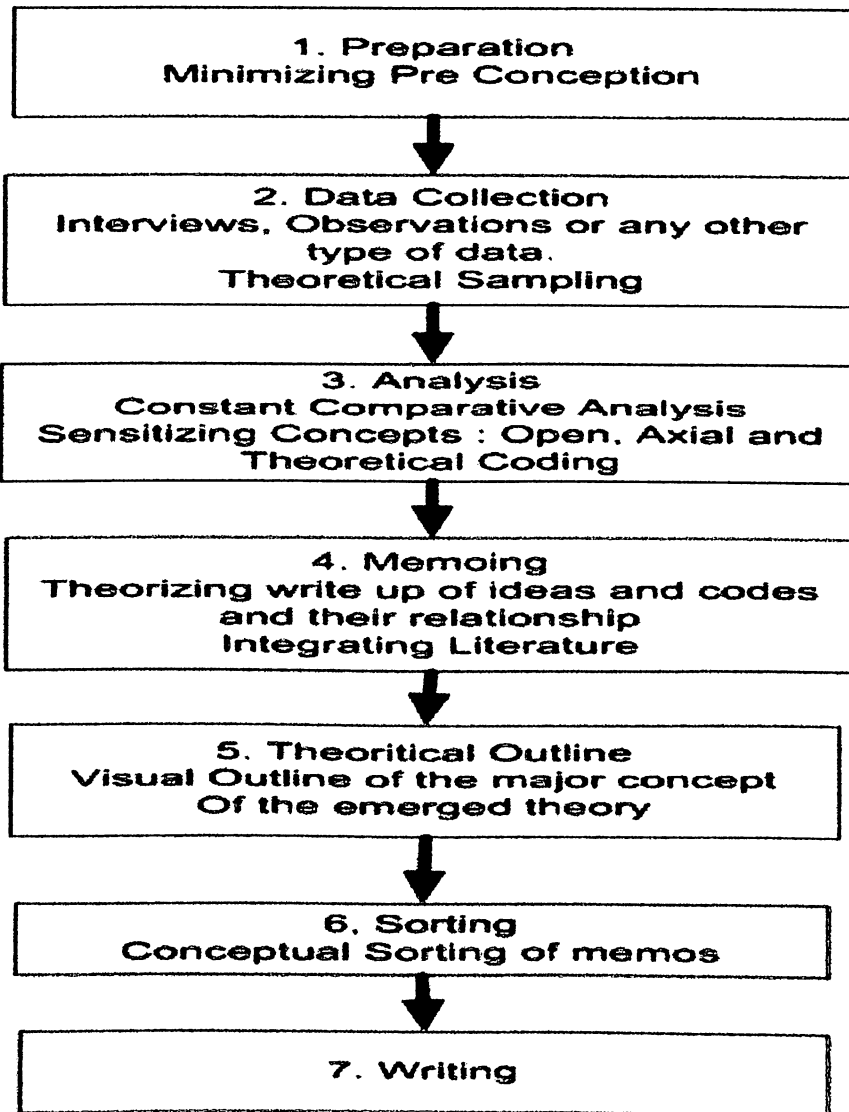
A Grounded Theory configuration is a composed, qualitative strategy used to deliver a theory that clarifies, at an expansive applied level, a method, a demonstration, or a correspondence about a subject (Creswell, 2008). Grounded theory is most generally utilized qualitative investigation utilized for research as referenced in Gibbs (2010).

Different techniques for data assortment:

- Interviews
- Observations

- Documents
- Historical Records
- Videotapes

The figure beneath represents the progression of Grounded theory research embraced



**Figure 3.4.1: Stages of Grounded Theory Research**

### **3.5 ADOPTION & DIFFUSION OF GIS IN POWER DISTRIBUTION SYSTEM**

#### **Prior Studies Examining User Acceptance**

The writing audit is essentially isolated into two sections. The initial segment talks about on model and speculations on technology acknowledgment, technology dissemination. The subsequent part spotlights and illuminates Geographical Information system, advancement of GIS in electricity dispersion organizations, research identified with GIS and how this technology has been instrument for power dissemination organizations

### **Development of Technology Acceptance Model**

The headway of TAM has been horrendously exciting and has experienced numerous changes. The progressions were because of the decent variety of the data system and were test. The following segment clarifies how Technology Acceptance Model (TAM) was grown at first and how later on it was advanced and changes to different variables which were significant for examination and determining of selection of technology in the association.

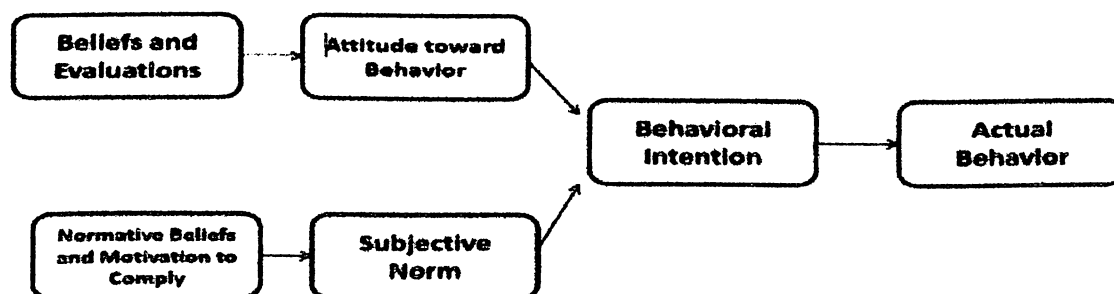
### **The Theory of Reasoned Action**

TRA was begat by Fishbein and Ajzen (1975) portrays the relations among convictions, approaches, standards, expectations, and practices of people. According to TRA, a person's conduct is controlled by its conduct goal to achieve it.

The theory can be very much communicated by the condition:

$$\text{Behavior Intention} = \text{Attitude} + \text{Subjective standards}$$

According to TRA, the disposition of a person towards a conduct is dictated by his standards on the outcomes of this conduct, duplicated by his appraisal of these results. The model suggests that outer upgrades sway frames of mind by changing the get together of the individual's perspectives.



**Figure 3.5.1: Theory of Reasoned Action**

## The Theory of Planned Behaviour

TBP theory that relations convictions and conduct the thought was IcekAjzen to expand the prescient power of the theory of contemplated activity by including apparent conduct control. The theory clarifies human conduct.

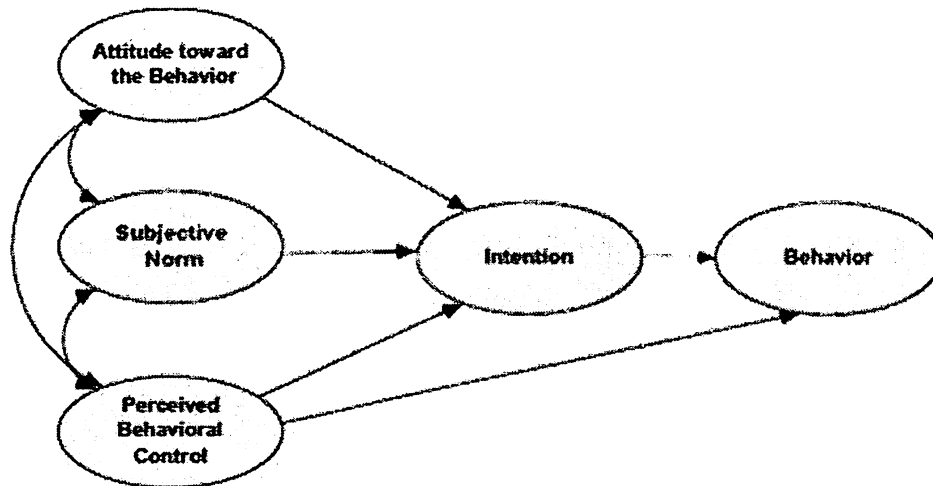


Figure 3.5.2: Graphical view of the theory of planned behaviour

## Decayed Theory of Planned Behaviour

The decayed theory of arranged conduct blows up the TPB idea by deconstructing frame of mind into three factors: saw value, convenience, similarity. The emotional standard is included two factors: peer impact and predominates impact. Seen social has three factors: self-adequacy, asset encouraging conditions and technology encouraging conditions.

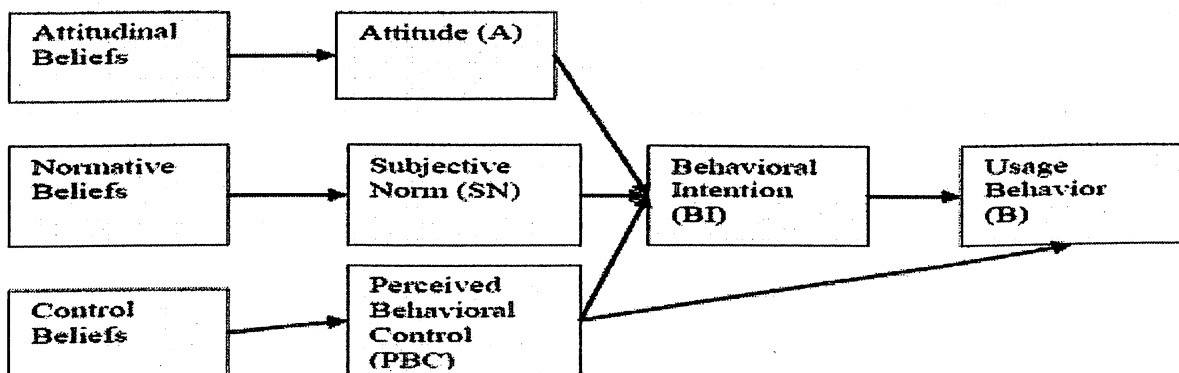


Figure 3.5.3: Decomposed Theory of Planned Behaviour

## **Studies Examining User Acceptance**

Eva-Maria Emsenhuber, Stephan Zielke (2012) clarifies technology acknowledgment model which predicts obtaining choice criteria of electric vehicles. UshaKaul (1988) proposition finds that the methodology embraced for building up a GIS by every utility is extraordinary, and the way toward learning and an extent of what is required to complete the destinations of the system has influenced the procedure of advancement for the system. A few variables clarify this: the outer conditions where these utilities work, the inward hierarchical conditions, including the job of an individual, the advancement approach, distinguishing proof of clients and their needs, meaning of the extent of the system, wanted utilization of GIS, and the degree of management support. The proposal suggests the procedures that ought to be trailed by electric utilities for fruitful advancement of a GIS.

Clarence RayfordBodreyJr (2006) assesses the information, frame of mind, and conduct with respect to the life span of the OSDS venture method by the Coastal Health District's Environmental Health Mangers and Inspectors. The goals were to: Describe the natural wellbeing office members by socioeconomics and decide the OSDS venture method appropriation rate among ecological wellbeing office members with respect to Voluntariness, Relative Advantage, Compatibility, Image, Norms, Complexity, Result Demonstrability, Observability&Trial capacity. The research clarified the model which included significant variables that have the effect of different receiving factors in Chinese swine cultivating industry.

## CHAPTER 4

### HYPOTHESIS FORMULATION

#### 4.1 HYPOTHESES FORMULATION

Literature Survey and profound comprehension of power distribution area brought about the definition of the accompanying research hypothesis. Three arrangements of theories have been planned. One set is 'Hypothesis on the degree of technology usage which was pertinent from the improvement of technology Index for Power Discoms' The subsequent set is Hypothesis deciding the website appraisal of power Discoms. The third set

'Hypothesis covering measurements of a factor which influences selection of GIS reception in power distribution organizations'.

Hypothesis on the degree of technology execution

Hypothesis dependent on mechanical execution level

H0-The degree of technology usage is same in power distribution organizations.

H1-There is a distinction in level of technology execution in power distribution organizations

Hypothesis dependent on relationship

H0: The technology usage record and AT&C misfortune are connected in power distribution organizations.

H01: There is no relationship between's technology execution list and AT&C loss of power distribution organizations.

Hypothesis with respect to the website appraisal of Power Discoms

The hypothesis shaped in the research of website appraisal list for power distribution organizations in National Capital district are as per the following:

H01: There is no huge relationship between's complete web quality and four classifications of website evaluation in power distribution organizations in National Capital Region.

H02: There is no generous distinction in the Discom savvy websites in NCR.

H03: There is no generous distinction in the class insightful Discoms Website.

H04: There is no distinction in satisfactory openness, speed, safety, and substance quality classification astute web nature of Website evaluation among government and private distribution organizations in National Capital Region.

Literature survey, the research of a few of different government reports and profound comprehension of technology management of Power Distribution organizations has brought about the plan of the research hypothesis.

Hypothesis covering factors which influence selection of GIS reception

H1: Discoms Staff disposition (AT) for GIS favorably affects expectation (INT) to rehearse the system.

H2: Perceived Ease of Use (EU) encouragingly affects mentality (AT) of Discoms Staff.

H3: Perceived Ease of Use (EU) encouragingly affects Perceived Usefulness (PU) of Discoms workforce.

H4: Perceived Usefulness (PU) has an empowering sway towards Intention (INT) of Discoms workforce.

H5: Perceived Usefulness (PU) has a promising upgrade on Attitude (AT) of Discoms Staff.

H6: Efficiency Gain (EG) encouragingly affects the Perceived Usefulness (PU) of Discoms Staff.

H7: Discom Organization Culture (DC) affects Intention (INT) of Discom staff.

H8: Top Management Support and Govt Initiatives (MS) encouragingly affects Intention (INT) of Discom staff.

H9: Employees Age and Years of Experience (AE) encouragingly affects Intention (INT).

H10: Discom Process Engineering (PE) encouragingly affects Attitude (AT).



## **4.2 RESEARCH OVERVIEW**

The Research Aim concentrating on the factor and worry that support the best technology appropriation by Power utilities for their different procedure and ebb and flow issues faces which can be tended to. The Research Methodology is clarified in Chapter-3 which grandstands depiction of the research techniques utilized for different objectives referenced before in this research. The research try was to see how these power distribution organizations have been utilizing technologies, to what degree in their different operational procedure just as business forms.

### **Research Framework**

A research system structures the research procedure into intelligent advances and proper stages. The foundation of an activity plan controls and direct the research so that there is a reasonable association between every one of the stages I e definition of research point and objectives, literature audit, data social event and examination and ends known over the span of investigation.

The research procedure was bolstered at all phases by a survey literature audit and research of applied just as observational literature. The literature was checked on and done in four different periods of the research. The primary stage was a primer investigation of the present situation of different sorts of technologies utilized in Indian Power distribution segment and furthermore the technologies utilized by other some other power distribution organizations on the planet particularly in created countries. This aided in the detailing of the research proposition and furthermore helped in the plan of the issue statement and research objectives.

## CHAPTER 5

### RESEARCH METHODOLOGY

#### 5.1 RESEARCH DESIGN

- Directing ahead from research inquiries to end is named as Research Design
- Understanding the attributes of Research Problem

To appreciate the research issue, the research title is again referenced as:

"A Research on Strategic Technology Management in Power Distribution Companies with Specific Reference to National Capital Region of India".

Research Design might be commonly named:

- Exploratory Research Design
- Illustrative and Diagnostic Research Design
- Hypothesis-Testing Research Design.

Exploratory Research Design:

This sort of research configuration is utilized is to outline a research issue for the advancement of a hypothesis. The point of studies is the finding of thoughts and appreciations. It points simply to find the research questions and doesn't mean to offer extreme and decisive responses to winning issues. Normally, the accompanying three methodologies are considered in the viewpoint of a research structure for such investigations.

They are

- A survey of the related literature.
- Experience survey.
- Analysis of 'understanding invigorating' occurrences.

Distinct Research Design:

It is a research intended to delineate the members in an exact manner. It can likewise be eluded as about research portraying individuals who participate in research.

There three manners by which graphic research task should be possible:

- Observational additionally alluded as a method for watching and recording the members.
- Case research: It can be alluded as top to bottom research of people or gathering of people
- Survey: It is characterized as brief meeting or exchanges with a person regarding the particular subject.

Hypothesis-Testing Research Design:

In this sort of research plan researcher test hypothesis between at least two factors.

In this research of the recognized research factors requires the utilization of quantitative just as qualitative strategies. Along these lines Data were gathered utilizing a poll based survey hours. The data gathered were then utilized for further investigation.

## **5.2 ORGANIZATION CULTURE**

It alludes to singular conviction and effects made by observing their friends, chiefs, and others around help or dishearten the utilization of technology in the association. The client's sexual orientation, age, and experience additionally importantly affect the Discom Organization Culture.

### **Expectation**

The expectation in this research has been utilized as an autonomous variable or exogenous variable and used to research the effects of the endogenous factors utilized in the research.

### **Top Management Support and Govt Initiatives**

It alludes to senior management backing and push for utilizing GIS in Discom and furthermore different Govt activities where GIS has been included

### **Discom Process Engineering**

It alludes to different activities where GIS has been connected with the different operational procedure just as the business procedure.

## **Discom Organizational Culture**

It essentially alludes to a situation in Discoms which are in support or against the utilization of GIS.

### **5.3 SAMPLING AND DATA COLLECTION**

A non-probabilistic strategy for testing was pursued. In the survey, each thing has an equivalent possibility of getting chose, and nonetheless, in non-probabilistic inspecting, it is accepted that example inside the populace has even qualities. Subsequently we can accept that example is illustrative of the populace with the end goal that the outcomes will be precise. Particularly regarding social institutional settings non-probabilistic inspecting is basic as it spares time and different assets. The present strategy is blend of judgment and ordinary inspecting. Out of approx. 63 power distribution organizations in India, four power distribution organizations in National Capital Territory were chosen for the research.

For technology usage and reception in power Discoms research theories and objectives, at first 400 questionnaires were circled in each Discom however the reaction rate was exceptionally low, at 20 percent significantly after a few development and rehashed calls. It was basically because of their bustling calendar and furthermore because of the delay of the representatives to react on such a touchy subject. In this way, it was enhanced with qualitative analysis By close to home meetings with Discoms staff at gatherings, discussions, additionally at instructional courses and furthermore at their workplaces. The researcher likewise utilized various techniques for grounded theory like chronicled records, perceptions report to get the experiences of the degree of technology usage in power distribution organizations in National Capital Region.

### **5.4 RESEARCH METHODS**

Different research methods which have been used in this research are as follows:

- Questionnaire Survey
- Questionnaire Design

Gathering of inquiries that are appropriate for the research point and its objectives and the reactions to which will give essential data to test research hypothesis addresses that evaluate the website of the power distribution organizations as far as substance, route, speed, and availability Each factor or measurements of the website was additionally separated into

smaller scale factors and markers and the equivalent was addressed with purchasers of power distribution organizations in their general vicinity.

Mapping technology which is being utilized in various power distribution organizations the various technologies are ordered into various classifications and every classification is then further sub-characterized and pointers connected to every full scale variable to quantify the research substance and answer the research addresses which are utilized to research and examine the different elements liable for reception and dispersion of technology in government just as Quasi-government power distribution organizations in National Capital Region.

### **Survey**

The survey for the research includes an alternate area of individuals dependent on the hypothesis picked to respond to research questions. Extensively there are two unique areas of individuals were distinguished for the research.

The first survey comprises of the customer in quite a while of power distribution organizations. The populace comprised of the buyer from various portions of customers from various RWA (Resident Welfare Associations), typical buyers, shopper's livings in JJ Clusters and so on. The populaces surveyed were to answer how individuals utilized the website of the power distribution organizations for their different undertakings and diverse data gave by the website of power Discoms.

The second survey for technology appraisal and appropriation in power distribution organizations includes Discoms claim staff, expert and furthermore staff working in Discoms in outsider finance at an alternate level in the chain of command in the Discoms. Since the research was to concentrate on technology selection and execution inside the association, so as to get top to bottom subtleties and understanding staff were met too surveyed utilizing poll

### **Interviews**

The various kinds of interview position are as per the following:

Organized interviews: It alludes to a sort of interview done by the researcher where types and number of inquiries is fixed by the researcher.

Unstructured interviews allude to the kinds of interviews which are indistinct and questions are not arranged already and the interview goes on in a casual way.

A semi-organized interview is a blend of organized and unstructured interview containing attributes of both organized and unstructured interview. In this interview has a rundown of inquiries heretofore yet can go past that likewise and pose extra inquiries.

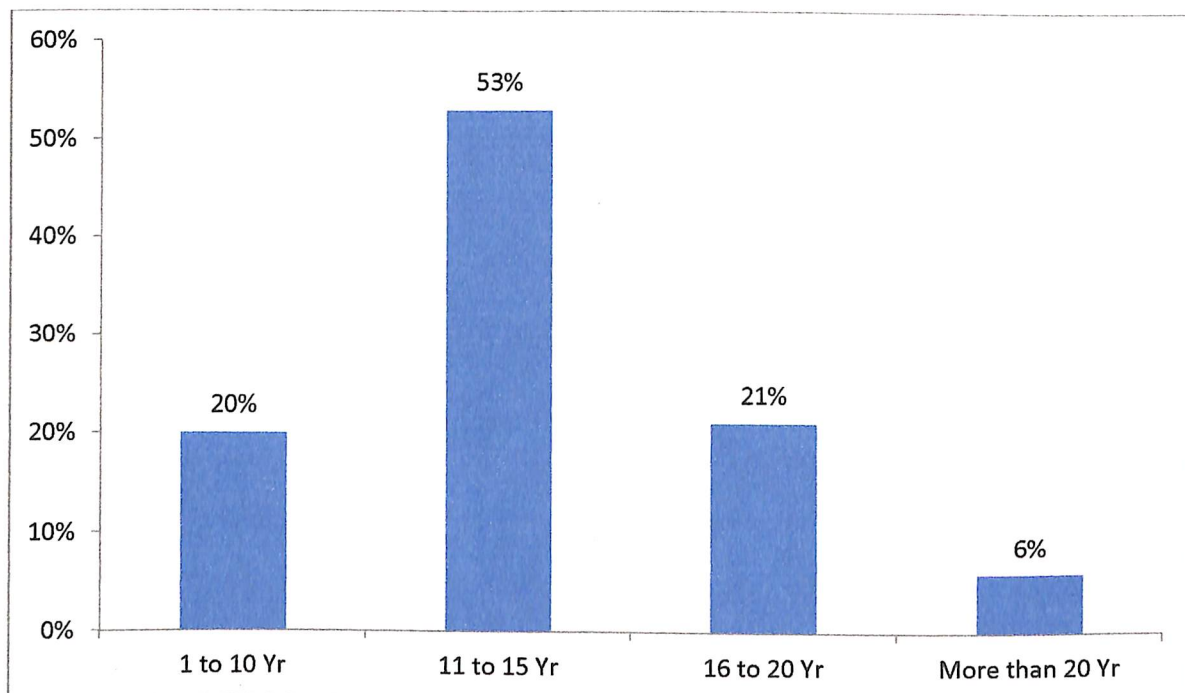
## CHAPTER 6

### ANALYSIS AND INTERPRETATION

**Table 6.1: Number of years of experience**

Years	Percentage
1 to 10 Yr	20%
11 to 15 Yr	53%
16 to 20 Yr	21%
More than 20 Yr	6%
Total	100%

**Chart 6.1: Number of years of experience**

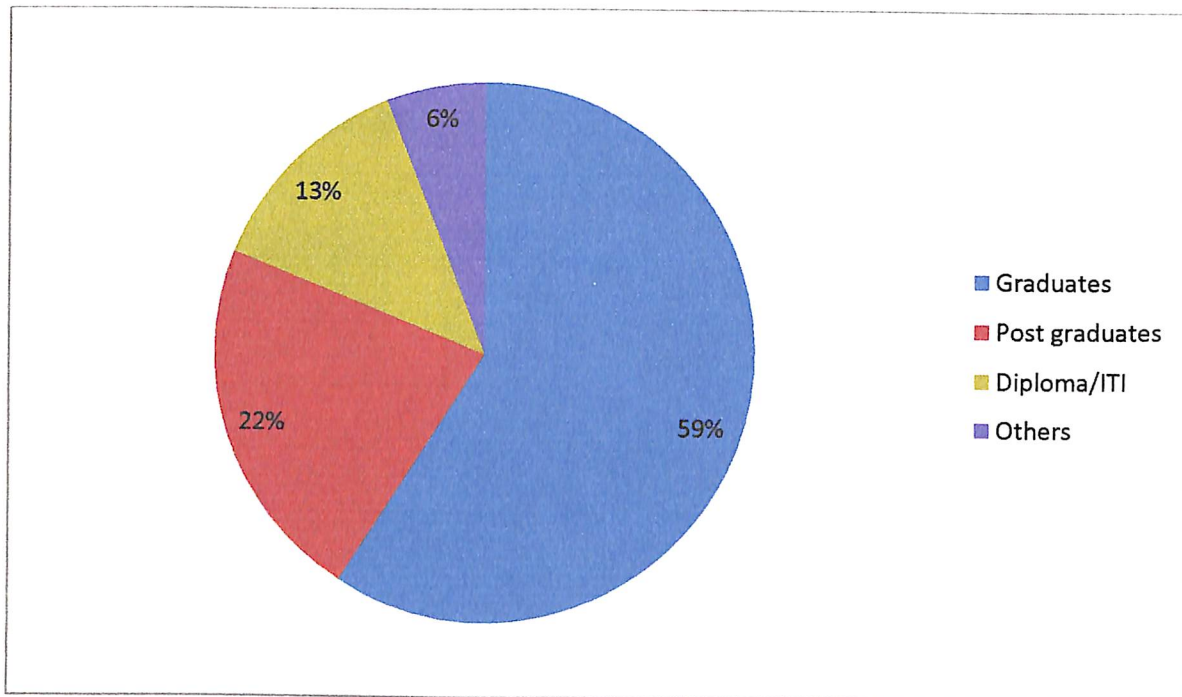


It is interpreted that from 11 to 15 yr 53% of them given response from Discom, 21% were 16 to 20 yr given the response of no of years of experience in Discom, 20% from 1 to 10 yr given the response of no of years of experience in Discom, and 6% from more than 20 yr of experience working in Discom

**Table 6.2: No of graduates in Discom**

Options	Percentage
Graduates	59%
Post graduates	22%
Diploma/ITI	13%
Others	6%
Total	100%

**Chart 6.2: No of graduates in Discom**



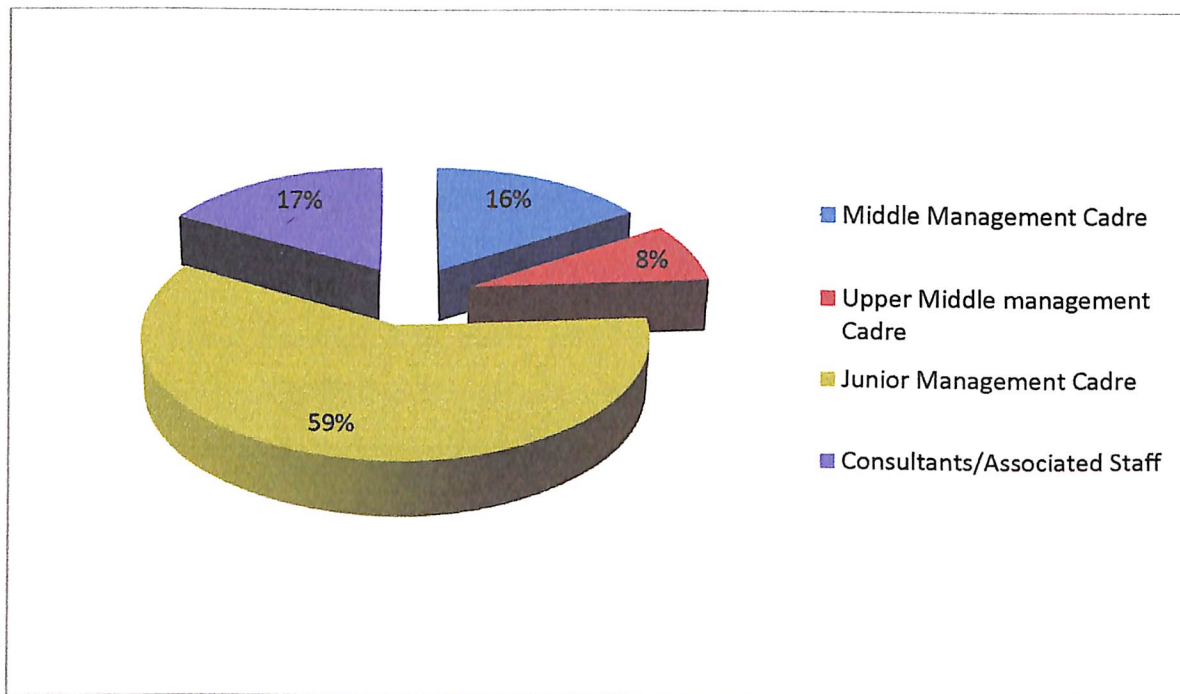
It is interpreted that 59% were graduates working in Discom, 22% were post graduates working in Discom, 13% were Diploma/ITI and 6% were others working in Discom when taking survey



**Table 6.3: Distribution of the staff with respect to management cadre**

Options	Percentage
Middle Management Cadre	16%
Upper Middle management Cadre	8%
Junior Management Cadre	59%
Consultants/Associated Staff	17%
Total	100%

**Chart 5.3: Distribution of the staff with respect to management cadre**



It is interpreted that 59% were junior management cadre, 17% were consultants/associated staff, 16% were middle management cadre are the distribution of the staff with respect to management cadre

## **HYPOTHESIS TESTING RESULTS**

H1: Discoms Staff demeanor (AT) for GIS favorably affects goal (INT) to rehearse the system.

The SEM analysis shows great relationship of demeanor of Discoms Staff for GIS technologies and goals of including GIS in his work any place required. The great affiliation implies 12% flood in aim for each flood in Attitude. Thus, the disposition of the Discoms Staff for utilizing GIS system is sure.

H2: Seen Ease of Use (EU) encouragingly affects disposition (AT) of Discoms Staff.

This hypothesis was not upheld. The discovering ( $\beta = -.13$ ) determines negative impact which implies that 11% abatement in (AT) demeanor with the ascent of one component increment in saw ease. Consequently, there is pernicious impact of usability on the mentality of the Discoms Staff for reception of GIS technology in their system

H3: Seen Ease of Use (EU) encouragingly affects Perceived Usefulness (PU) of Discoms workforce.

The analysis that the third hypothesis was bolstered. The discovering ( $\beta = .54$ ) shows a decent reassuring relationship among saw usability and saw value of Discoms Staff for the appropriation of GIS technology. Along these lines we can say there's 54 % flood in helpfulness for one component increment in convenience for Discoms staff.

In this way, how much technology is anything but difficult to utilize prompts the better utilization of GIS.

H4: Seen Usefulness (SU) impacts Intention (INT) of Discoms Staff.

The discovering ( $\beta = .41$ ,) demonstrated that hypothesis was upheld and represents a decent solid relationship among saw convenience and saw value of Discoms Staff for utilization of Geospatial technology. This good affiliation shows 41% flood in expectations with each component ascends in Usefulness of Discoms staff. Helpfulness of GIS technology makes ideal impact and effect on the goal of the Discoms staff.

H5: Seen Usefulness (SU) has a promising boost on Attitude (AT) of Discoms Staff

The value of the GIS technology makes a good effect on the frame of mind of the power Discoms staff, the analysis results demonstrates the equivalent.

H6: Effectiveness Gain (EG) encouragingly affects the Perceived Usefulness (PU) of Discoms Staff.

The analysis yields unmistakably show effectiveness gain has an empowering impact on the value of the system. This can comprehend the way that one standard increment in EG brings about 21% expansion in saw helpfulness.

H7: Discom Organization Culture (DC) impacts Intention (INT) of Discom staff

The outcomes demonstrated that social standards have irrelevant impact on the aims for utilization of GIS technologies for their work. This great impact shows that for 4% flood in aim for the ascent in Discom Organization Culture

H8: Top Management Support and Govt Initiatives (MS) affects Intention (INT) of Discom staff.

The hypothesis was upheld as top management backing and government activities have a positive association with Intention of the Discom staff to utilize GIS technology. This obviously shows government is particularly worried about the utilization of GIS technology in Discoms and furthermore because of this senior management of the Discom additionally support on the mixture of the technology in the different procedure of the Discoms. Truth be told, the government has started different reviews dependent on GIS to implant it in different process and furthermore help them in decreased field visits of the staff.

H9: Representatives Age and Years of Experience (AE) encouragingly affects Intention (INT).

The hypothesis was not upheld based on relapse analysis and SEM Model. The outcomes show that there is a unimportant connection between the age and experience of the representatives and Intention to play out the work utilizing geospatial technologies in the Discom.

H10: Discom Procedure Engineering (PE) positively affects Attitude (AT).

The tenth hypothesis isn't upheld. This shows there is no significant relationship between Discom process designing and demeanor of the Discom staff. The inconsequential connection proposes when GIS has been mixed in different business and operational procedure of the Discoms and the disposition was irrelevant among the staff. The outcomes uncovered that at first, the Discom staff were impervious to utilize the GIS yet in the vast majority of the cases, it was discovered that later on when the advantages were noticeable they begun utilizing the technology and favorably affects frame of mind. The table underneath shows the rundown of the hypothesis which was expected by the researcher based on survey and recognized during the research with results

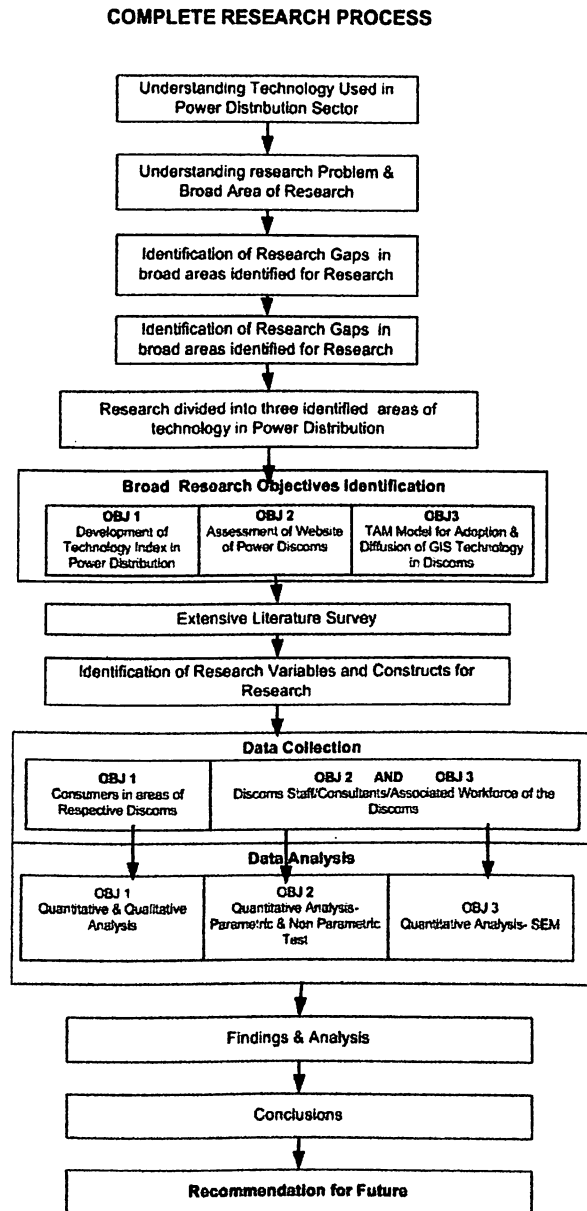
**Table 6.4: Hypothesis Testing Results**

Sl. No	HYPOTHESIS	RESULTS
H1	Discoms Staff demeanor (AT) for GIS favorably affects goal (INT) to rehearse the system	SUPPORTED ( $\beta = .12$ )
H2	Seen Ease of Use (EU) encouragingly affects disposition (AT) of Discoms Staff.	SUPPORTED ( $\beta = -.13$ )
H3	Seen Ease of Use (EU) encouragingly affects Perceived Usefulness (PU) of Discoms workforce.	SUPPORTED ( $\beta = .54$ )
H4	Seen Usefulness (SU) impacts Intention (INT) of Discoms Staff.	SUPPORTED ( $\beta = .2$ )
H5	Seen Usefulness (SU) has a promising boost on Attitude (AT) of Discoms Staff	SUPPORTED ( $\beta = .46$ )
H6	Effectiveness Gain (EG) encouragingly affects the Perceived Usefulness (PU) of Discoms Staff.	SUPPORTED ( $\beta = .22$ )
H7	Discom Organization Culture (DC) impacts Intention (INT) of Discom staff	SUPPORTED ( $\beta = .04$ )
H8	Top Management Support and Govt Initiatives (MS) affects Intention (INT) of Discom staff	SUPPORTED ( $\beta = .59$ )
H9	Representatives Age and Years of Experience (AE) encouragingly affects Intention (INT).	SUPPORTED ( $\beta = .23$ )
H10	Discom Procedure Engineering (PE) encouragingly affects Attitude (AT).	SUPPORTED ( $\beta = -1.05$ )

# CHAPTER 7

## CONCLUSION AND RECOMMENDATIONS

### 7.1 Conclusion



**Figure 8.1.1: Complete Research process designed by Researcher**

#### Summary with respect to Research Objectives

The discoveries of the various segments of the research are blended as for the research objectives.

Extensively research objectives proposed for accomplishing the research point of 'Strategic technology management for power distribution organizations in National Capital Region'.

### **Research Objectives 1**

- To observationally assess the status of technology execution among the power distribution organizations by building up a complete record, viz., Power Distribution Technology Index (PDTI)

The power distribution utilities in India have just actualized some IT and computerization technologies and the rest are in the various phases of execution of these technologies. In light of the data gathered through survey and interviews and further examine the outcomes were inferred, there is the distinction in the degree of technology execution in power distribution organizations. The power distribution technology file is an unmistakable pointer of technology execution in Discoms which obviously shows PPP Discoms score superior to Govt Discoms in National Capital locale.

Metering for all activity and change of mechanical meters to electronic meters cut down AT&C level radically in 2003-2005, the misfortune levels from 61 % to 36 %. In Discoms Implementation of Information Technology was straightforwardly liable for the intense decrease in AT&C misfortunes. Technology bit by bit checks acknowledgment among clients over some undefined time frame and diminishes AT&C misfortunes. AT&C depends straightforwardly on numerous variables, particularly business misfortunes and social financial conditions where in some cases technology needs to assume little job. A superior technology organization at Discoms has contributed essentially towards bigger decrease in AT&C misfortunes.

### **Research Objectives 2**

*The point of this research is an evaluation of websites of Discoms in NCR. The online website evaluation devices were utilized for appraisal of different parameters and determinants and afterward factual procedures were utilized to test the hypothesis confined. In this research, we conscious the goal of the Web appraisal. To test its legitimacy Chi-square test was utilized investigate power distribution organizations' website.*

The research uncovers contrasts in Discoms websites of National Capital area, particularly the organizations score high in regard of content, ease of use, and route. Additionally, there is

a noteworthy distinction in different parameters of websites for power distribution organizations taken in the research. The state-run power Discoms are falling behind in meeting the data and administration needs of their residents and are at the beginning periods on the development bend, to the extent that the viability of their websites is concerned.

The Chi-Square test obviously shows that invalid hypothesis accepted that is bogus and in this manner there is a huge relationship between's all-out web quality and four classifications of website evaluation in Discoms. Additionally, there is a noteworthy contrast in the power utility astute website appraisal among Discoms.

Open Private Companies Discom score better as far as website factors related with website evaluation Index and has better and increasingly enlightening website which is very applicable from the table. There is likewise a distinction in website segments of each of the four Discoms.

The research uncovered 81% of the clients and 73% not utilize websites for the most part because of online dependability issues/Payment of Bills at Nearby Discom Offices/Use of Drop Box/Banks. The research featured that following are a portion of the reasons, why various buyers have not utilized the website of Discom:

- Lack of Awareness. The research shows that numerous customers of the Discoms didn't know about the different installment offices accessible on the websites through which they can undoubtedly make installment without going anyplace and whenever.
- Intermediaries a few retailers and mediators frequently prevailing with regards to convincing the client to profit manual bill installment benefits by them.
- Lack of activity from Discoms in regards to mindfulness for a website.
- Busy Schedule of the residents: Middle-Class families who are many occupied in their activity takes help of these mediators for installment of bills and some other questions.
- Lack of web office in customers: Some purchaser doesn't approach the web, because of which they can't get to the websites and don't know about the different offices gave to the shoppers.
- Easy accessibility of close by Discoms charge installment workplaces of bill installments and fathom their different questions.

- Security and unwavering quality issues in online bill installment. : Some customers had an awful encounter of getting charged from account however it was not credited to their buyer charge accounts. Afterward, they needed to pay again and follow up to recoup their cash. So they feel it's smarter to go to client care focus and make charge installment instead of online installment by getting to the websites.

Better Quality website is contributing towards higher use IT retail application by buyers which may reflect in better consumer loyalty?

### **Research Objectives 3**

*The third research objective aims at assessment of Adoption & Diffusion of GIS among State Owned & Quasi Government Power Distribution Companies in NCR.*

The research expects to quantify client reason to receive the GIS and to investigate the connection in the midst of client acknowledgment and goal elements to embrace the technology which is still in early stage regarding technology acknowledgment and dispersion in the power organizations. The research is an endeavor to investigate and assess the angles contacting the utilization of GIS technologies among state-possessed and semi government see organizations in National Capital area.

SEM (Structural Equation Modeling) procedure was utilized since is high multi-co linearity among the factors ie; free factors cover and utilizing relapse we can't isolate the total effect of one variable from another. The researcher needed to affirm whether these free factors are uniting to one factor for Confirmatory Factor Analysis utilizing SEM (AMOS Software). Ends and conceivable proposal for acknowledgment of the technology have additionally been talked about ahead.

### **Conclusion: Enquiry on Reception of GIS amongst Discom Employees**

For Discoms Staff usability is a higher priority than convenience of the application according to the (H2). The research uncovers that in spite of the fact that GIS technology may not be anything but difficult to utilize, the representatives knows their value and significance in improving their work which can be uncovered by the way that convenience impacts apparent value. Technology make isn't anything but difficult to use to Discoms staffs are especially worried about the helpfulness of the technology and how GIS can help in their everyday work



and make their work simpler. Discom interior groups exhibit the client bunch convenience of the GIS and how their present procedure can be improved utilizing GIS.

According to H4 and H5 an inspirational mentality towards utilizing helpful applications is contributing towards achievement of technologies arrangement.

A portion of the applications are difficult and convenient for the Discoms staff thus this makes negative frame of mind and furthermore this, thus, makes negative impact on goal of Discoms' staff.

The research uncovers that ebb and flow GIS UI may not be extremely simple to utilize , however the representatives knows their value and significance in improving their work which can be uncovered by the way that convenience has positive impact on apparent helpfulness.

Research hypothesis gathers H (6) uncovers staff of Discoms feels if technology brings about effectiveness gain their expectations are certain for utilizing the technology

According to results of hypothesis H (7), Discom association culture is has positive goal in utilizing GIS technology.

Research hypothesis H (9) uncovers Discoms, staff with more Years of Experience and Age don't empower utilization of technology.

The research (H8) uncovers Top Management of Discoms are particularly worried for execution of GIS technology in Discom.

In any case, progressively dynamic and sharp in this regard for In Government Power Regulator has ordered GIS based reviews for the plans executed by the Discoms just as GIS drawings to be connected for all Project Report submitted to Govt activities still have not made procedures GIS based.

According to results of research hypothesis (H10) Discomstaff doesn't back Discom Process Engineering, so Top Management is exceptionally sharp in making business and operational procedure technology based. Be that as it may, has started these procedures scarcely any years back and they are ahead of time organize,

For instance, as of late in Discoms, Network Planning and Quality Engineering has been re-designed and has been made GIS based.

Comparative is the situation additionally Discom staff don't back Process Engineering, yet Haryana is still in beginning phase of actualizing technology based Discom Process Engineering.

The research shows that dominant part of the staff of both Discoms who were working significantly more concerned and hesitant to technology reception and dispersion due actuality of dread of loss of their worth and employment. On the other center management staff of Discoms was not especially worried about the adjustment in technology occurring. The senior management of both Discoms was truly great in taking measures for appropriation and dissemination of technology in their individual Discoms. This unmistakably applicable from the statistic profile of the staff who participated in the research a large portion of them were from junior management unit.

## **7.2 Critical Research Contribution**

The different systems to do the research and land at ends and dependent on that the creator feels the accompanying research commitments has been made in the field of research around there:

According to literature survey discoveries, such research and survey on technologies utilized in Indian Power Distribution area have not been directed till date. Subsequently, this research prepares for scholastics and officials to comprehend the worries in technology acknowledgment in this part Websites and Portals are quick turning out to be helpful stages for clients not exclusively to get to valuable data yet in addition to make charge installments, stop client grumblings and so on. Be that as it may, clients use them just if the websites are easy to use. Up until this point, no research was done on acknowledgment of web technologies by clients of Indian Power distribution organizations. This research gives bits of knowledge into basic variables to utilization of websites of the Power Distribution Companies by the clients. This research additionally planned a file for website evaluation, considering the parameters:

As numerous technologies are conveyed in power distribution part, a general Technology Assessment Index is proposed just because to survey arrangement of technologies in power distribution division. Technology Assessment Index can be utilized as an apparatus for near evaluation of technologies being used in various organizations. It can likewise be utilized as a

benchmarking device by approach creators in positioning the states dependent on Technology Assessment Index.

The research sets up the importance of qualitative techniques for research particularly the grounded theory which has been utilized by the researcher in the research and this can shape the base of comparable sorts of research of different areas as well.

Since the research was directed for semi government and government power Discoms in NCR, a similar research philosophy can be utilized to research the equivalent in the other Indian States as well, giving due thought to winning social and social elements.

Taking into account that technology acknowledgment by representatives and clients are basic for improving operational efficiencies all things considered, a similar philosophy can be received with alterations, if necessary, for taking up contemplates in different parts, also.

Structure was created for evaluation of websites of power Discoms in India. These aides in near appraisal of websites and help in improving the websites of Discoms in India.

### **7.3 Limitations of the Research**

- In spite of the fact that Power Discoms have numerous offices and tremendous staff at various levels, every one of them couldn't be secured. The researcher attempted to cover all the significant divisions, important to the research.
- The survey couldn't catch any money related or business data, as respondents would not like to reveal the equivalent due to privately issues.
- Research data gathered from just four Power distribution organizations of National Capital Region, which are government claimed or semi government. it didn't cover any entirely exclusive power Discoms.
- Just a single technology among the various technologies being spent in the power distribution part i.e.; GIS has been taken up to research reception and dissemination of technology in power distribution organization.
- The research considered just the elements at the individual level yet not at gathering/group level. Furthermore, the research didn't consider authoritative components like hierarchical culture, administration styles and so forth.
- The systems created by the researcher for vital management of technology can be additionally stretched out to government claimed state electricity sheets and numerous

different components and markers which may be pertinent according to their social and statistic conditions.

#### **7.4 Recommendation for Future Work**

The survey can be led in different areas of and states where the greater part of these technologies are in various phases of execution. Studies may likewise concentrate on the explanations behind the disappointment of Accelerated Power Development Reform Projects, began by Ministry of Power, Government of India.

The research can be additionally broadened and top to bottom research can be done on appropriation and dispersion of some particular technologies like SCADA, computerization and so on. The research system, which has been utilized in the research, can be utilized for research in different nations with comparable financial conditions as to Indian conditions, which may incorporate South Asian and African nations.

The research structure, which has been utilized in the research, can be utilized for research in different nations with comparable financial conditions as to Indian conditions, which may incorporate South Asian and African nations.

The Power distribution technology Index can be utilized as research instrument for appraisal of technologies in different areas of and states of India.

#### **Summary**

The research outlines the total research process embraced for the research; clarifies the total research process taken up in the research. Every objective was taken separately and dependent on analysis the ends were encircled against every objective. The part at that point condenses the significant discoveries prompting exchanges on the critical research commitments, the ramifications of the research and constraints of the research. Zones for further research are recommended to close the holes and to continue improving the research.

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