

Effectiveness of Rural Electrification Training in India

**A Thesis Submitted to the
University of Petroleum & Energy Studies (UPES)**

**for the Award of
Doctor of Philosophy
in
Management (Power)**

**By
Scholar Name: APARUP PAUL**

March 2023

**Supervisor
Dr Ruchi Tyagi, Internal Supervisor
Dr T S Surendra, External Supervisor**



UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

(UPES)

P.O. Bidholi Via-Prem Nagar,

Dehradun-248007

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DECLARATION BY AUTHOR

I declare that the thesis entitled “Effectiveness of Rural Electrification Training in India” has been prepared by me under the guidance of Dr. Ruchi Tyagi, formerly Sr. Associate Professor at the School of Business, University of Petroleum and Energy Studies (UPES). No part of this thesis has previously formed the basis for awarding any degree or fellowship.



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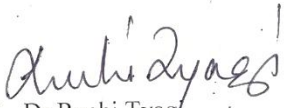
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GUIDE DECLARATION CERTIFICATE

I certify that Aparup Paul has prepared his thesis entitled "Effectiveness of Rural Electrification Training in India", for the award of PhD degree of the University of Petroleum & Energy Studies, under my guidance. He has carried out the work at the Department of School of Business, University of Petroleum & Energy Studies.



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ABSTRACT

Rural electrification has a significant role in developing the Agrarian economies like India. The hundred percent village electrification in April 2018 provided “connection to all” but could not ensure “power to all”. The frequent and prolonged outage hours mark poor power supply and power reliability of electrification in rural areas mainly because of insufficient distribution infrastructure and poor financial health. With the crunch in financial resources, DISCOMs depended primarily on funding from the Ministry of Power, Government of India through capacity building initiatives of various rural electrification Schemes such as RGGVY, DDUGJY etc. to train their human resources. Under these policies, approximately ₹1500 million was spent on training on rural electrification during the last two decades. Training and DISCOM base research studies highlight effective measures in human resources to bridge gaps related to skill and calculation of return on training investment made in tangible and non-tangible resources in DISCOMs to meet rural electrification challenges. The rural electrifications ROI-based training effectiveness framework DISCOM training is a key corporate issue that, if addressed, can reduce opportunity expenses by improving DISCOMs' capacity to grow, their viability and commercial operation in rural distribution, contributing to rural electrification and building DISCOMs financial health and infrastructure in the long term.

The literature review on six keywords, ‘Indian Power sector’; ‘Rural Electrification’; ‘Rural Electrification Training’; ‘Training effectiveness’; ‘Framework of Training’; and ‘ROI of Training’ scopus, web of science, and google scholar databases contained leading to 603 documents which on the application of exclusion and inclusion criteria reach to 343. Themes identified at the first stage of the literature review were, ‘*Rural Electrification Training in Indian DISCOMs*’, ‘*Framework for Effectiveness of Training in DISCOMs*’ and ‘*Measuring method of return on investment (ROI)*’ with underpinning theory, “Phillips theory on ROI of Training”. On Consolidating the thematic and theoretical research gap fulfilling the funnel approach (Roller, 2016), the identified research gap shows a dearth of literature on the RoI framework for rural electrification training of DISCOMs. The research problem featuring the research gap is, "What should be adopted by DISCOMs for measuring the effectiveness of Rural Electrification training in terms of ROI?". What should be the framework for ROI is the research problem's research question. *of Rural Electrification Trainings of DISCOMs*’ directs for qualitative research design with research methodology at the literature review stage [review methodology

(Snyder, 2019)] and data analysis stage [framework methodology with three steps viz, Data Management, descriptive analysis and data interpretation (Smith & Firth, 2011)]. On 343 documents, by applying mixed-method appraisal tool, a review sample of 42 documents is reached for review analysis. Review analysis output and conceptual framework are used to prepare the interview protocol. The validity and reliability of the interview protocol are conferred by triangulation, reflexivity, data immersion, and crystallisation.

The research findings on the research question establishes the connection between various costs and benefits of training, the measuring methods, the factors affecting training effectiveness for measuring ROI and ways to isolate and benefit from the framework for rural electrification. Although all the respondents agreed on the benefit of training and the ROI framework, they suggested differently to accurately capture intangible costs and intangible benefits through feedback, surveys, reports, informed guesses and the use of samples to test the validity of estimates and measures KPIs. Therefore, the discussions on the research objective, ‘to formulate the framework for ROI of rural electrification training of DISCOMs’, furthered the ROI-based framework on training effectiveness for rural electrification strengthening the draft on training effectiveness framework to accurately capture various tangible and intangible data for cost and benefit of training in DISCOMS for calculating ROI of training, incorporating the measures of return on investment of training, capturing the effectiveness of the training programme by comparing different training programmes based on their ROI and justify the investment in training.

The research concludes that the draft transfer scheme incorporated in DISCOM’s training policy framework can choose the best training programme and identify causes for low ROI of training programmes leading to improvement in training effectiveness.

The theoretical implications of the study are reflected in the finding that the period for calculating the cost and benefit of training can change the ROI results, and this framework includes the period. Furthermore, managerial implications suggest that effective management of training programmes with strategic formulation of training policy with proper training need analysis is suggested for higher ROI. However, like any other research, this research has limitations for not including training of contractual workforce employed in DISCOMs or licenced retailers like rural electrification cooperatives.

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LIST OF ABBREVIATIONS

ACS	Average Cost to Serve
AMP	Ampere
ARR	Aggregated Revenue Requirement
AT&C	Aggregated Technical and Commercial Loss
AVVNL	Ajmer Vidyut Vitaran Nigam Limited
BBC	British Broadcasting Corporation
BCR	Benefit-Cost Ratio
BI	Business Impacts
BPL	Below Poverty Line
CAIDI	Customer Average Interruption Duration Index
CAQDASs	Computer-assisted qualitative data analysis software
CBT	Calculation of Benefits of Training
CBIP	Central Board of Irrigation and Power
CCT	Calculation of Cost of Training
CEA	Central Electricity Authority
CERC	Central Electricity Regulatory Commission
CESC	Chamundeshwari Electricity Supply Corporation Limited
CGWB	Central Ground Water Board
CIPP	Context, Input, Process and Product
CIRE	Central Institute of Rural Electrification
CIRO	Context Input Reaction and Output.
CPRI	Central Power Research Institute
CR	Current Role
Cr	Crore =10 Million
CRISIL	Credit Rating Information Services of India Limited
CRM	Customer Relationship Management
DDUGJY	Deen Dayal Upadhyaya Gram Jyothi Yojana
DISCOMs	Electricity Distribution Companies
DPE	Department of Public Enterprise

ESCI	Engineering Staff College of India
ET	Effectiveness of Training
FoR	Forum of Regulator
GBS	Gross Budgetary Support
GENCOs	Generation Companies
GLCs	Government Linked Companies
GoI	Government of India
GTQ	General Questions Based on Training Experience of the Respondent
HBR	Harvard Business Review
HDI	Human Development Index
HELM	Human Element, Leadership and Management
HESCOM	Hubli Electricity Supply Company Limited
HPSEB	Himachal Pradesh State Electricity Board
HR	Human Resource
HRD	Human Resource Development
IEA	International Energy Agency
IEEE	Institute of Electrical and Electronics Engineers
INR	Indian Rupee
IPDS	Integrated Power Development Scheme
IRENA	International Renewable Energy Agency
JdVVNL	Jodhpur Vidyut Vitaran Nigam Limited
JKPDD	Jammu and Kashmir Power Development Department
JPDCL	Jammu Power Development Corporation Limited
KESB Ltd	Kerala State Electricity Board Ltd.
KFW	Kreditanstalt für Wiederaufbau
KPDCL	Kashmir Power Distribution Corporation Limited
KPIs	Key Performance Indicators
Lakh	0.1 Million
LEM	Learning Effectiveness Measurement
LoS	Length of Service

LPG	Liquefied Petroleum Gas
MMAT	Mixed-Method Appraisal Tool
MNRE	Ministry of New and Renewable Energy
MoP	Ministry of Power
MPPKVCL	MP Paschim Kshetra Vidyut Vitaran Co. Ltd
MSEDCL	Maharashtra State Electricity Distribution Company Limited
NEP	National Electricity Policy
NGOs	Non-Governmental Organization
NPDCL	Northern Power Development Institute of Telangana
NPTI	National Power Training Institute
NTP	National Training Programme
O&M	Operation and Maintenance
OECD	The Organisation for Economic Co-operation and Development
PDD	Power Development Department
PFC	Power Finance Corporation Ltd
PMI	Power Management Institute
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
PSUs	Public Sector Undertaking
PSSC	Power Sector Skill Council
R-APDRP	Restructured Accelerated Power Development and Reforms Programme
RDSS	Revamped Distribution Sector Scheme
RE	Rural Electrification
REC Ltd	Rural Electrification Corporation Limited
RECIPMT	REC Institute of Power Management & Training
REMI	Reliance Energy Management Institute
RGVY	Rajiv Gandhi Grameen Vidyutikaran Yojana
RM	ROI Methodology
ROI	Return on investment

SAIDI	System Average Interruption Duration Index
SAIFI	System Average Interruption Frequency Index
SAUBHAGYA	Pradhan Mantri Sahaj Bijli Har Ghar Yojana
SCM	Success Case Method
SCOE	Standing Committee on Energy
SDG	Sustainable Development Goal
SERCs	State Electricity Regulatory Commission
SoP	Standard of Performance
T&D	Transmission and Distribution
TANGEDCO	Tamil Nadu Generation and Distribution Corporation Limited
TBE	Training-Based Experience
TNA	Training Needs Analysis
TRANSCOs	Transmission Companies
TSSPDCL	Telangana Southern Power Distribution Company Limited
UDAY	Ujjwal DISCOM Assurance Yojana
UN	united nations
UNDO	The united nations Development Programme
URJA	Urban Jyoti Abhiyaan
USAID	The United States Agency for International Development
VMM	Value Measurement Methodology
WEF	Water, Energy and Food

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CHAPTER 1

BACKGROUND AND INTRODUCTION

1.1 BACKGROUND

India is the seventh-largest country area-wise and second-largest population-wise globally (Ministry of Statistics and Program Execution, 2011). According to the Census of India 2011, out of the 121 billion Indians (1210 million), 83.3 billion live in rural areas and 37.7 billion reside in urban areas, meaning that almost 70 per cent of the population of the nation resides in rural areas (Ministry of Statistics and Programme Implementation, 2011). According to the State Census 2011, India has 497 cities, 246,692,667 households and around 6 lakh villages (Total Census villages 597270, inhabited villages 593,615).

Rural electrification aligns with developmental priorities in India (Birol, Cozzi, Bromhead, Gould, & Baroni, 2014). The objective of the Government of India for rural electrification is to eradicate poverty and foster opportunities for rural India (Planning Commission, 1985). Agriculture and other vital activities, including as small and medium-sized businesses, khadi and village industries, health care, cold chains, education, and information technology, all require access to electricity (MoP GoI, 2006). There is a nexus between energy consumption and living standards (Parekh, 2005; Sattler, 2012). Electricity is the primary source of a better household living standard, income generation and improvements in the Human Development Index (HDI) (Samanta, 2015).

Availability of electricity facilitates access to most basic facilities such as safe drinking water, public lighting, health care, education etc. (N. D. Rao & Pachauri, 2017). Access to modern energy [Modern Energy comprises electricity (Kamalapur & Y, 2011; Suhlrie et al., 2018) for lighting, cooking,

heating and powering appliances at the level of households and institutions is crucial to socio-economic development. Electrification ensures economic development by providing livelihood opportunities in rural areas (Njiru & Letema, 2018). Lack of access to electricity is a significant barrier to alleviating poverty. Challenges in the availability of affordable and reliable energy supply, in turn, led to slow social and economic development (Riedel & Sachs, 2005; Sreekumar et al., 2019). Thus rural electrification in India is of paramount importance in the social and economic development of its 70% of people living in Villages and towards the overall GDP of the nation.

1.2 INTRODUCTION

Rural electrification in India started since Independence with relatively slower pace. In India, rural electrification was not specifically mentioned in federal legislation until 2003 (Modi, 2005). In India, the idea of rural electrification originally centred on "electrification for irrigation" to boost the nation's agricultural output. Later, recognising the need of providing energy to rural areas, this shifted to a more concentrated strategy (Samanta, 2015).

TABLE 1.1:RURAL ELECTRIFICATION, RE IN INDIA (1950-2019)

Sl No	Year	Development
1	1950-1965	<ul style="list-style-type: none"> • Only 3061 villages were electrified till 1950 • 1951-planned electrification of villages focusing on electricity as a social amenity • More than 45,000 villages Electrified
2	1966-1980	<ul style="list-style-type: none"> • More than 2.20 lakh villages were electrified, and 43 lakh pump sets energized • Electricity Role is focused on the development of Input with a primary objective of energizing pump sets • Rural Electrification Corporation was established in 1969
3	1981-1990	<ul style="list-style-type: none"> • More than 2.20 lakh villages were electrified, and 43 lakh pump sets energized • RE used as a tool for correcting regional inequalities
4	1991-2003	<ul style="list-style-type: none"> • Focus on System Efficiency rather than Coverage • Deterioration of SEBs Broke the tempo of Rural Electrification • Only 44,000 Villages electrified

5	2004-2019	<ul style="list-style-type: none"> • Focus on specific comprehensive Yojana (Programme) for Household Electrification and Village electrification like RGGVY (subsumed in DDUGJY), SAUBHAGYA leading towards universal electrification (including BPL Families). • The World Bank’s rating on the ‘Easeof Getting Electricity’ Index rose from 99 in 2009 to 26 in 2017. • All villages electrified under DDUGJY by April 2018 (i.e. 5,93,615 Villages of India as per Census 2011) • Almost 100% of households electrified under SAUBHAGYA Yojana by March 2019 (Source: Saubhagya Portal Report, Ministry of Power)
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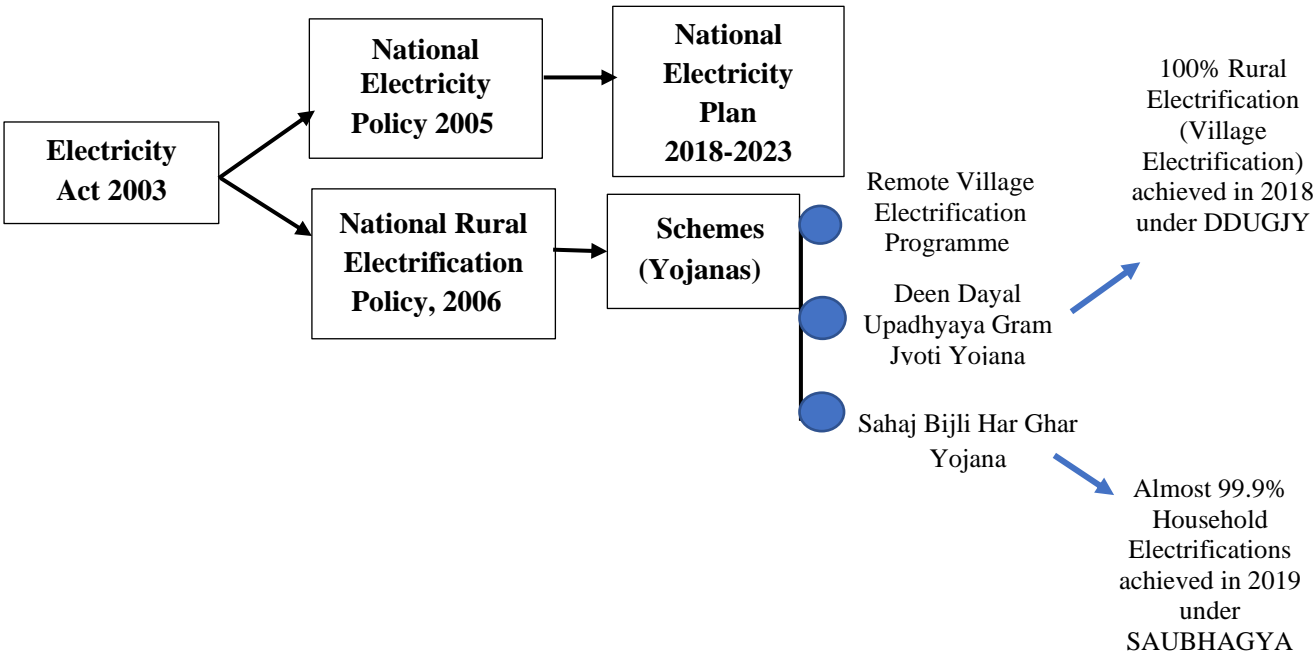
Source: Compiled by the researcher (Ref: MoP, REC’s DDUGJY and Saubhagya portal Reports)

The mandate of rural electrification was reiterated with the electricity act 2003 (Electricity Act 2003, 2003) enacted 18 years ago, which focuses on “promoting competition therein, protecting the interest of consumers and supply of electricity to all areas”. The 2003 Act attempted to build competitive Indian electricity markets, provided a wide choice of generators and ‘obligated’ the government (provincial and federal) to provide electricity to everyone, even in remote locations. Before this, efforts to provide power across the country were seen as including rural electrification (Sankar, 2009). Later policies for rural electrification in 2006 defined the scope of rural electrification, focusing on village electrification by creating distribution infrastructure (MoP GoI, 2006). With the increasing recognition, according to Baskaran et al. (2015), household electrification was used as a political tool to win elections, which gave the government additional motivation to deliver "electricity for all" by hurriedly electrifying all villages by 2007 and all homes by 2012.

1.2.1 RURAL ELECTRIFICATION IN INDIA

The process of rural electrification was centrally funded in India. DISCOMs are licensed to distribute electricity as per the Electricity Act 2003 and have a universal obligation to serve rural and urban consumers falling under their licenced area. Thus, all Rural electrification initiatives are focused on supporting

and strengthening DISCOMs for providing electrification to the rural areas falling under them (Niti Ayog, 2020). However, though rural electrification has started since independence, it is only in recent years govt of India has come up with policies such as National Rural Electrification Policy, 2006 to address various challenges associated with rural electrification (such as - technical, financial, regulatory, and institutional) that impeded India's effort to provide everyone with access to electricity (Shakti foundation, 2021; MoP GoI, 2006). Figure 1.1 highlights the rural electrification landscape



Source: Compiled by Researcher
 (Ref: Ministry of power Gazette Notifications of Policy & Schemes 2003, 2004, 2005, 2006, 2012-2019)

FIGURE 1.1: RURAL ELECTRIFICATION POLICY OF INDIA (2006-2019)

According to Douglas F. Barnes, “Well-planned, carefully targeted and effectively implemented rural electrification programs benefit rural people” (Banerjee et al., 2015; Barnes, 2007). In April 2018, India realised 100 per cent rural electrification (MoP GOI, 2019). However, the connections to all do not assure the quality of supply and service (Sreekumar et al., 2019). Lack of

adequate infrastructure and an adequately trained workforce were reasons for poor rural electrification (Report of the working group on power for 11th & 12th plan).

Over the last 70 years, more than ₹3000 billion has been invested in rural electrification (Niti Ayog, 2019). ₹1,719,770 Million have been invested over the last 15 years in rural electrification through two schemes, i.e. RGGVY and DDUGJY, and according to government statistics, every village has been electrified, and over 90% of homes are connected (Manabika et al., 2019). This investment is expected to return development dividends for the Government of India sanctioned this amount through Rural Electrification Policy under different schemes.

To finance and promote rural electrification across the country, the Government of India established Rural Electrification Corporation in 1969 (renamed as REC Limited in 2015). With programmes for household electrification in rural and semi-urban areas, electrification in tribal and Dalit areas intense electrification, and system electrification, REC was responsible for development of power distribution by strengthening and improving sub-transmission and distribution network. Until 2000, the portfolio of Generation projects in RECs was limited to size, location, capacity (25MW) and grid (Mini/Micro). However, REC's mandate was broadened in June 2002 to include funding all power projects (REC Annual Reports 2015,2016,2017,2018,2019, 2021). REC had been working for rural electrification in India and acted as the nodal agency for various rural electrification schemes. These schemes are discussed below:

Rajiv Gandhi Grameen Vidyutikaran Yojana (RGGVY)

The Rajiv Gandhi Grameen Vidyutikaran Yojana (RGGVY) was introduced in 2005 as part of the United Progressive Alliance's 'Bharat Nirman' initiative, by merging all previous current electrification programmes. RGGVY is a comprehensive policy had changed approach from a concessional funding to providing grants to states (REC, 2005). RGGVY aimed to electrify all un-electrified villages, provides electricity access to rural households, and provide 23.4 million free electricity connections to BPL (below the poverty line) households. This was the first comprehensive policy focusing on rural

electrification and merged other schemes such as the Minimum Needs Programme (MNP), Kutir Jyoti Scheme, and Accelerated Electrification of one lakh villages and one crore households (Banerjee et al., 2015; REC, 2005).

It focused on creating village electricity infrastructure required for providing electricity to rural India. It attempted to address common problems of rural electricity distribution such as lack of maintenance, low load density, rising delivery costs and poor power supply quality (Planning Commission, 2014). To ensure revenue sustainability of DISCOMS, MoP GoI introduced a concept of rural electrification distribution franchises responsible for metering, billing and revenue collection (MBC) for designated territories (REC, 2005). In some cases, input-based franchises were also installed, where they procure electricity in bulk from the distribution utility and distribute the same in their operational areas. Despite early achievements in better service delivery, effective revenue collection and billing, etc., the franchisee under RGGVY failed to accomplish its goal of ensuring revenue sustainability and efficiency improvement (Chaurey et al., 2012) as many employees of various DISCOMS were sceptical, believing it is a backdoor way to privatisation.

The accomplishments made under RGGVY for village electrifications are outstanding. 79 % of partially electrified villages were intensified with additional village electricity infrastructure, 95 % of the targeted un-electrified villages were powered up, and 77 % of the below-poverty line homes were connected. However, the percentage of all rural electrified only increased from 43% to only about 56% (Lok Sabha Secretariat & Standing Committee on Energy, 2013; Planning Commission, 2014). In the case of the above-poverty line category, only 1.5 million households were connected, which is only 3% of the total target of 54.6 million (Sreekumar N & Shantanu Dixit, 2011). The programme focused mainly on village electrifications without giving much attention to usage of electricity and thus did not focus much on issues such as quality of electricity supply, infrastructure sustainability of sub-transmission and distribution network and the accessibility of electricity for the purpose of promoting rural development. Thus, the programme did not provide the desired results of universal electrifications.

Deen Dayal Upadhyaya Gram Jyoti Yojana (DDUGJY)

Rajiv Gandhi Grameen Vidyutikaran Yojana, the first comprehensive electrification scheme of Government of India scheme was subsumed in Deen Dayal Upadhyaya Gramm Jyoti Yojana (DDUGJY) in 2015. DDUGJY addressed challenges faced during RGGVY such as separating domestic and agricultural feeders to provide 24/77 power supply to households irrespective of population size. Extra impetus was given by Govt of India to electrify all remote and inaccessible unconnected villages by May 2018, either by expanding the grid or by decentralised distributed generation, and all homes will have 24-hour power by 2019. This has sped up programme implementation; as a result, there were just about 486 villages in India where electrification work has not yet begun (as of April 2017). In addition, a new Tariff Policy was announced in January 2016 with the goals of rationalising prices for consumer categories, bringing mini-grids under regulatory control, and motivating private sector investment to support public efforts to expand access to electricity (DDUGJY,2015).

Under the DDUGJY scheme, ₹663,536 million expenditure was made towards rural electricity infrastructure and household electrification (MoP, GoI). Components of DDUGJY include (i) separation of agricultural and non-agricultural electricity feeders to improve supply for consumers in rural areas, (ii) improving sub-transmission and distribution infrastructure in rural areas, and (iii) rural electrification by carrying forward targets specified under the RGGVY. Under the scheme, the Government of India provides 90% of the overall cost of projects as capital subsidy. On 28-Apr-2018, 100% rural electrification (Village electrification) was completed (DDUGJY, 2015).

SAUBHAGYA YOJANA, 2017

With this Pradhan Mantri Sahaj Bijli Har Ghar Yojana, 99.99% of household electrification is made by the 20th day of March 2019 (MoP GoI Saubhagya Portal, 2020). Figure 1.2 highlights the progress to 100 per cent rural electrification.

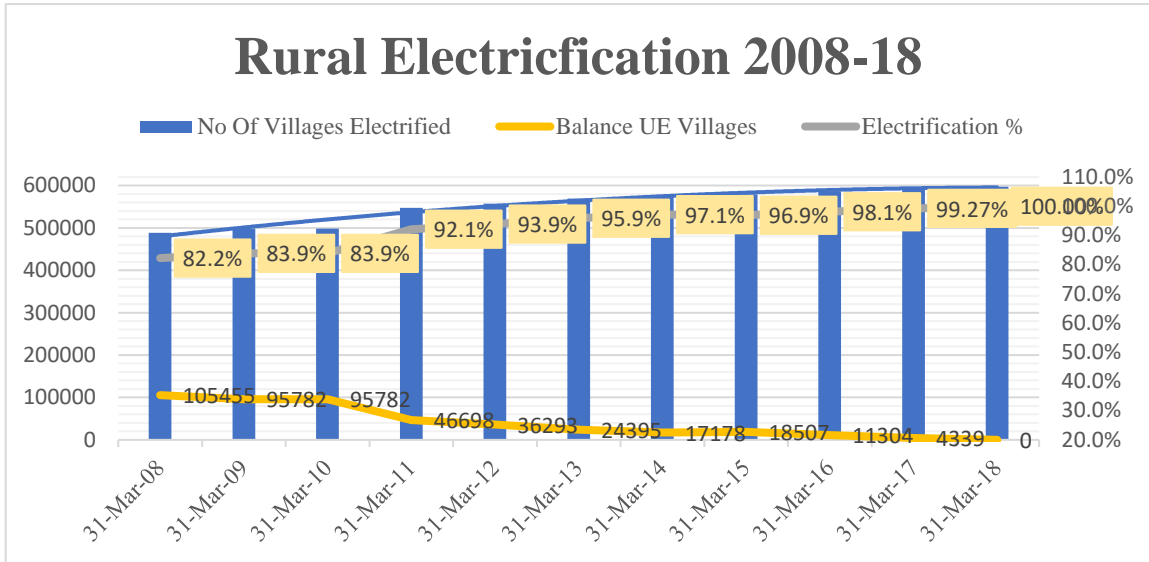


FIGURE 1.2: VILLAGE ELECTRIFICATION FROM 2008-2018

Source: Compiled by Researcher

Ref: Monthly and Annual CEA Distribution & Village Electrification Reports from 2008-2018

Figure 2 signifies that the maximum progress has been made in the last decade. In March 2019, the Power Finance Corporation (PFC) acquired 52.63% of ownership in REC for ₹14,500 crores (REC Limited Annual Report, 2020)

1.2.2 TRAINING FOR RURAL ELECTRIFICATION

DISCOMs, the licenced monopoly retailer for electricity, are India's central point for rural electrification. The training for rural electrification aimed to develop human capital in DISCOMs for last-mile connectivity with reliable and sustainable power. The capacity building component of Rural electrification schemes such as RGGVY, DDUGJY etc., was ₹1500 million and invested in training employees of DISCOMs (DDUGJY, 2015; REC, 2005). In addition to the MoP, GoI sponsored training; a few distribution utilities train their employees at their own cost (self-finance). The training

institutes in the power sector provide training for DISCOMs RECIPMT, Engineering Staff College, NPTI, REMI, etc. (Gupta & Agarwal, 2018; Paul & Tyagi, 2022). Only a few DISCOMs have a training policy stipulating a training budget even at 2% of the salary expense. Almost all DISCOMs are lossmaking and do not have the budget for training expenditure investment. Thus, training expenditure provided by MoP and GoI through various RE schemes and other reform schemes is the foremost training expense source for DISCOMs.

There are more than 100 training institutes in the power sector. About 55 institutes are accredited in the power sector (CEA, 2019). However, only a few of them caters to the training need of the rural distribution network.

REC. Figure 1.3 summarises the self-finance and ministry-sponsored training to bridge the skill gaps of utility employees and others.

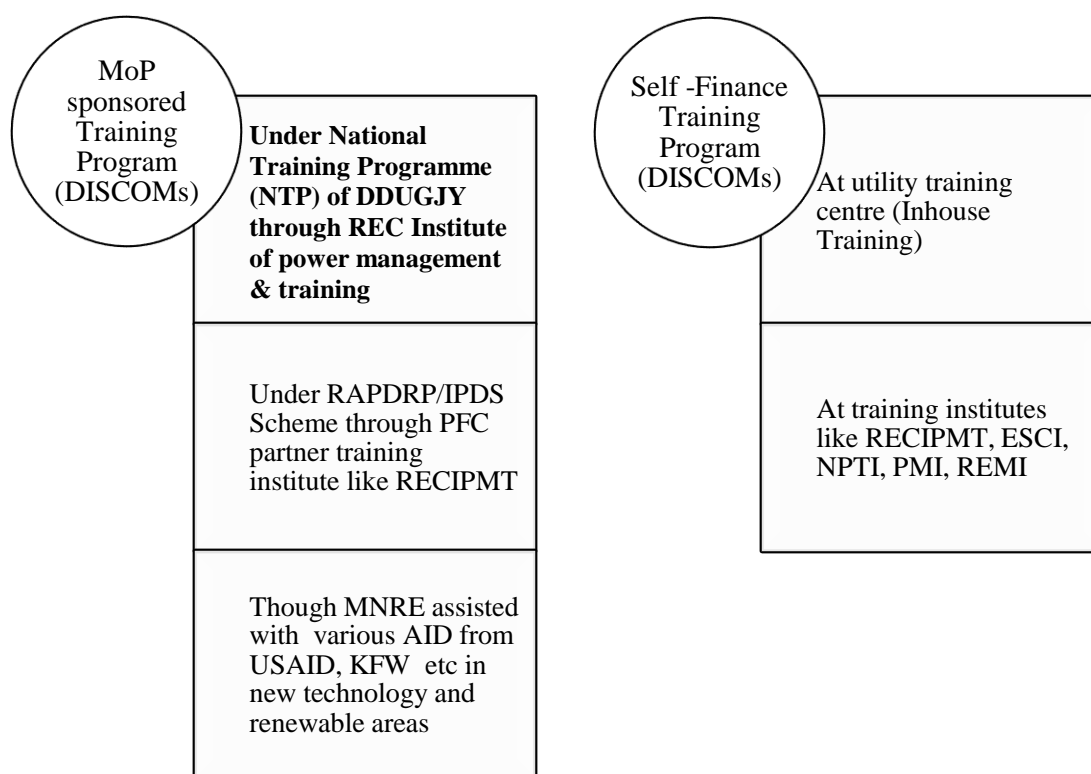


FIGURE 1.3: TRAINING FACILITATED BY INDIAN DISCOMS FOR ITS EMPLOYEES (2002-2019)

Source: Compiled by Researcher

Ref: Report on working Group of Power; Training, Practices of Various Utilities; Working Group on Power Planning Commission, 2012; RECIPMT-CIRE, 2015;

Forum of (Regulator,2016; Vishwakarma & Tyagi, 2016; Tyagi & Vishwakarma, 2017)

MoP stands for Ministry of Power, and DISCOMs stands for Power Distribution Companies.

REC Institute of Power Management & Training (RECIPMT): REC Institute of Power Management & Training (RECIPMT), formerly the Central Institute of Rural Electrification (CIRE), carried out capacity-building training for the power generation companies (GENCOs), power transmission companies (TRANSCO) and power distribution companies (DISCOMs) and others training programmes under MoP & MEA (Ministry of External Affairs. Out of the three (GENCOs, TRANSCO and DISCOMs), the RECIPMT mainly conducts training programme for employees of power distribution utility i.e., DISCOMs. Regarding training on rural electrification, RECIPMT has supported Govt of India in capacity building under rural electrification policies such as RGGVY, DDUGJY and SAUBHAGYA. In the policy statement, 2012-17 of RGGVY (subsumed in DDUGJY in 2015), Govt of India has made a budgetary allocation of ₹1500 million for the National Training Programme (NTP) intended for rural electrification and the nodal agency was RECIPMT of REC Ltd.

Need-Based Skill Program for C&D Employees

All rural electrification schemes had training and development as part of enabling component. For example, the RGGVY which was subsumed into DDUGJY had training of C&D Employees under enabling component. RECIPMT implemented need-based skill development training for capacity building of 1,25,000 C&D category employees of Distribution Power Utilities across the country by March 2017 (i.e., 12th Plan).

The C&D category of the employees includes many non-executives in the secretarial wing, accounts wing, and technical wing. Non-executives and Class-IV in Power Distribution Companies are grouped as C&D employees. The C&D staff are the UDC, LDC, stock verifier, store clerks, typist, etc. helper, linemen, line inspectors, electrician, sub-station operators, consumer complaint attendants, and meter readers fall under the technical staff.

The C&D employees required operate at the advanced level with much-needed skills and competencies to achieve rural electrification. With C&D training, it was expected that the trainee would deliver their responsibilities in a superior manner, leading to a reduction in repair and maintenance cycle time, reduced pilferage of electricity, improved staff safety, and a degree of consumer satisfaction (Lidia Staron, 2018; Schroeder-strong et al., 2022).

Approximately 2,49,107 participants have received training under this scheme. In addition, RECIPMT provided seven training areas for C&D employees (helper, line inspectors, linemen, electrician, sub-station operators, consumer complaint attendants, and meter readers) of DISCOMs (RECIPMT-CIRE, 2015).

Training for Universal Household Electrification

Under SAUHAGYA scheme, RECIPMT has conducted 42 training programs. The total cost of training was ₹18.9 million and covered 18 states engaged in household electrification. The trainees covered the contract agency's utility engineers and field-level supervisors engaged in household electrification. The focus of these programs was:

- 1) To bring awareness about standards, specifications and construction practices regarding power distribution systems during construction and Household Electrification,
- 2) To highlight the importance of quality of works while execution in household electrification works,

To clarify doubts about technical problems while ensuring the quality of works in installation for the long sustenance of the distribution system

1.3 MOTIVATION BEHIND THE STUDY

Rural electrification has undergone a significant change in recent years because of the deepened reach of electricity to every village and every household across the nation. New schemes for electrifications have been introduced by Govt. of India, new technologies have come to the power sector, and training has received higher importance. The effort and investment on Govt over 75 years in the rural electrifications scheme achieved 100%

connection but did not result in universal access (CEA, 2020). The per capita electricity in India is 1208 kWh (Chaitanya Mallapur, 2021) which is even lower than developing nations like Brazil, China, and South Africa. This indicates enormous scope for improvement towards the effective utilisation of electricity. The most critical barriers to effective utilisation are affordable, reliable and sustainable power for everyone. Thus, looking into rural electrification problems is still necessary for the nation's holistic development. The investment in rural electrification had been more than ₹3000 billion. Part of the investment (more than ₹1500 million in the last 15 years) was used towards capacity building in DISCOMs for Rural Electrification (Paul & Tyagi, 2021).

India has more than 41 DISCOMs besides a few rural cooperatives, Circilla Electricity Cooperative Society (CESS), Anakapalli Rural Electric Cooperative Society Limited (ARECS), The Hukkeri Rural Electric Cooperative Society Ltd (HRECS) etc., working as retailed licenced to provide electricity across the nation (PFC Ltd, 2021). Only a few of the DISCOMs have their training policy, such as MPMKVVCL (MP Madhya Kshetra Vidyut Vitaran Corporation Ltd), MPPKVVCL (MP Paschim Kshetra Vidyut Vitaran Co. Ltd), TRIPURA State Electricity Corporation Limited), KSEB, WBSEDCL, MAHADISCOMs etc. (Gupta & Agarwal, 2018; Roy & Verma, 2016). In line with the national training policy for the power sector (MoP GoI, 2002), the policies broadly focused on

- Training organisation's structure and infrastructure
- Training budget
- Training mondays
- Training needs assessment (TNA)
- Training Calendar
- Training nominations process
- Training faculties and honorarium cost
- Training feedback

[Compiled by Author, Ref : (Training Policy of Madhya Pradesh Madhya Kshetra Vidyut Vitaran Company Limited, 2019; Training Policy Madhya

Pradesh Pashchim Kshetra Vidyut Vitaran Company Limited, 2022; Training Policies Compendium, 2015; Tripura State Electricity Corporation Limited, 2020)]

Training policies of DISCOMs have mentioned any evaluation or assessment of training, such as pre-post assessment of training. For example, the newly formed MPPKVCL introduced an assessment of reaction and learning level measurement by capturing a pre-post questionnaire. On the other hand, rural electrification training funded by MoP and GoI and conducted at DISCOMs does not contain any evaluation of organisational results. As mentioned by Tannenbaum (2002) and further detailed by Raymond (2010), without the evaluation of training, the training objective of enhancing knowledge, skill and ability can never be achieved, and the process of transfer of training cannot be improved (Raymond A.Noë, 2010; Salas et al., 2012).

All these cumulatively required evaluation of the effectiveness of the training in Rural Electrifications (RE) in India, thus triggering research on the subject and motivating the researcher of this subject to have a deep dive. Moreover, there have been many schemes of MoP and GoI towards distribution reforms. The latest Revamped Distribution Scheme (RDS) was launched in July 2021 to ensure the quality and reliability of power supply to all consumers through a financially sustainable and operationally efficient distribution sector. This policy also provides capacity building with an outlay of ₹200 Crore for training (MoP GOI- RDS Scheme, 2021). The study on the effectiveness of Rural electrification training proposes to address this skill gap even after budgetary allocation and provide a solution for improving the effectiveness of rural electrification training in India. The study aims to benefit DISCOMs in developing its workforce with enhanced skill, knowledge and ability to address the various challenges in rural electrification. This study will also have further scalability in adding values to all other training of DISCOMs.

Thus, the study underwent by the researcher proposed to address the issue of the “**Effectiveness of Rural Electrification Training in India**”.

1.4 RATIONALE OF THE STUDY

Despite 100% village electrification and almost 100% household electrification, India faces an energy trilemma, defined as the triple challenge of providing secure, equitable, affordable, and environmentally sustainable energy (Mishra, 2019). The following points further expand the present study's energy trilemma and need.

Connection For All To Power For All

The central government declared that all villages in India were electrified on 28-Apr-2018 when the last village in the country, leasing in Manipur, was electrified. The Prime minister of India stated, “28th April 2018 will be remembered as a historic day in the development journey of India (Geeta Pandey, 2019). Yesterday, we fulfilled a commitment due to which the lives of several Indians will be transformed forever! I am delighted that every village of India now has access to electricity” (tweet dated 29 April 2018 made by Shri Narendra Modi, Prime Minister of India, over his Twitter account).

The 100% Village Electrification refer here is a connection for around 5,97,000 villages of India and not 100% of Households of India (Ministry of Statistics and Programme Implementation, 2011; MoP GoI, 2006). The definition of the Electrified village as per section 5.1 of the National Rural Electrification Policy is the same defined as follows in O.M.No. 42/1/20011-D(RE) from the Ministry of Power dated February 5, 2004, as given below.

A village will be considered as electrified based on a Certificate issued by the Gram Panchayat fulfilling the following

- a) Basic infrastructure for rural electricity distribution are provided in the inhabited locality and a minimum of one dalit basti / hamlet where it exists
- b) Electricity is provided to public places (like schools, panchayat office, health centres, dispensaries, community centres etc)
- c) The number of households electrified is at least 110% of the total households in the village.

Even prior to 2004, village electrification meant a village where electricity is used for any purpose in the inhabited locality within its revenue boundary. 100% village electrification does not mean 100 % household electrification. In April 2018, 31.94 million households (14 per cent of total households) were left to be electrified. Govt. of India had launched SAUBHAGYA in Sept. 2017 with gross budgetary support (GBS) is INR 123200 million to electrify 35 million households by March 2019. According to the most recent data on the Saubhagya website, only 20,000 or so Chhattisgarh households are still connected (MoP GoI Saubhagya Portal, 2020) against central government action to connect all houses in India (99.99%) on 31-Mar-19. All the above are the connection facility for all houses in India. The availability of connections does not guarantee power availability for all, as detailed in Table 1.2.

TABLE 1.2: POWER SUPPLY IN RURAL AREAS OF A FEW INDIAN STATES SHOWING AVAILABILITY AND ACCESSIBILITY GAP

Parameters of Rural Electricity	Uttar Pradesh	Bihar	Odisha	Rajasthan
Daily supply hours (average)	11.6	14.8	19.1	16.7
Evening supply hours (average)	3.2	4	4.4	4.3
Days with low voltages per month (average)	2.6	1.9	1.1	1.2
Metered connections	48%	71%	86%	79%
Regular billing	21%	40%	87%	78%
Average electricity bill (INR/month)	360	223	250	560
Status of Household Electrification	100%	100%	100%	100%

Source: (Smart Power India, 2019)

The online monitoring and survey made by Prayas Group in 2019 suggest min of 6 to a maximum of 12 hours of power supply in the rural areas. Reportedly, in rural areas, the average hours of power supply in a day ranged from 12 hours in Mizoram, 15 in Haryana and 18 in Uttar Pradesh to 24 hours in Kerala, Gujarat, and Tamil Nadu in January 2018 (Smart Power India, 2019) in comparison to national average outage across DISCOM is more than 5 hours from July 2018-2019 (URJA Portal, 2019)

This can be further understood by the availability and adoption of grid electricity for rural households, as presented in Figure 1.5

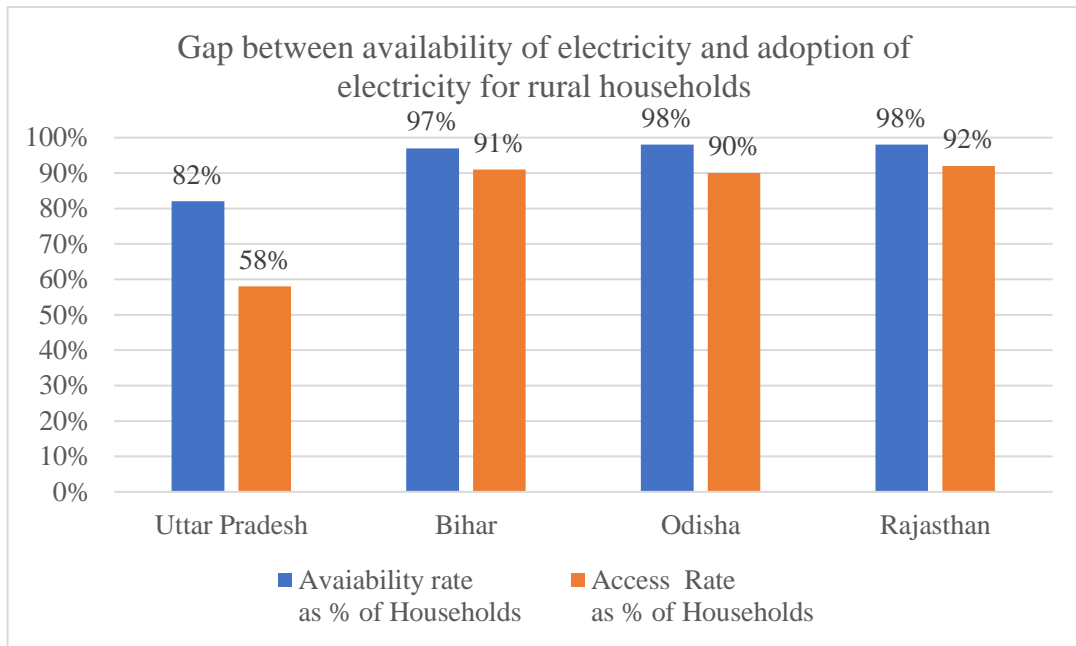


Figure 1.4: Power Supply in Rural Areas of a Few Indian States Showing Availability and Accessibility Gap

Source: (Smart Power India, 2019)

Connection For All To Reliable Power Supply For All

Traditionally rural electrification focused on the physical wire to the home, not service delivery. However, the gains due to electrification are not with connection rather associated with the reliability of grid supply- its availability, predictability and quality (Harish & Tongia, 2014). According to Yael Borofsky (2015), the Electricity Act 2003 Act , the watershed act in power sector paved the way for policies for rural electrification – 1) the National Electricity Policy (NEP 2005) and 2) the Rural Electrification Policy (2006) (Borofsky, 2015). The NEP outlined a plan for ensuring that all families have access to power within five years, including requirements to reduce or eliminate generation shortages and supply a minimum of one unit of electricity per family per day by 2012 (Kumar & Chatterjee, 2012). Ironically, the mandates to provide free, lifeline electricity and reduce degeneration shortages goes against each other. Electrification is a three-step process. Extending the village's infrastructure is the first phase. Connecting the household is the next stage. The third and most difficult stage is to provide a consistent, affordable supply (Gill et al., 2019). “The government has achieved the first goal, and the second goal is progressing. We now have to look forward to how the most critical goal unfolds” (Dutt D’Cunha, 2018). Thus, electrification connections are just a good beginning (Swain et al., 2019) and not the end of the rural electrification process. The connection challenge for rural electrification may have been met, but the supply challenge was not resolved. To enhance living conditions and promote economic activity, as stated by IEA, it is mandatory to ensure an affordable and reliable electricity supply. While enabling the availability of electricity in the village is the first important step, it has eclipsed the need to provide quality access and service to rural customers (Smart Power India, 2019).

Jean Dreze and Amartya Sen described the non-reliable supply as an expression given to "managing the outages, instead of doing something about them” (Drèze Jean & Sen, 2013). Data on issues with the quality of the electrical supply are limited and problems with electricity supply quality and its effect on-productivity including agriculture and community are less addressed because

the main focus of rural electrification was on connectivity. There is limited access to electricity to rural consumer (BBC, 2018; The Economic Times, 2018; The Hindu, 2019). Various challenges of distribution companies related to maintaining revenue sustainability, theft and keeping AT&C losses within the prescribed regulatory range besides providing reliable and quality supply (Gill et al., 2019).

According to government data, rural areas have a supply for 16 to 24 hours. Surveys of consumers and sample measurements reveal significantly fewer hours. According to a Smart Power survey, half of the households face an eight-hour power outage every day, and nearly half of rural businesses rely on non-grid supply choices. Only half of all villages receive more than 12 hours of supply, according to the ministry of rural development's 2017 nationwide study of all villages (Josey et al., 2017). According to Prayas's Electricity Supply Monitoring Initiative, which used 200 monitors in 23 States, half of the locations had 2-4 disruptions per day in rural areas and outages of more than 15 hours per month (Gill et al., 2019).

DISCOMs should improve the quality of supply and reliability of supply duration. The basic requirement for consumers to get a consistent, dependable, and high-quality supply from the distribution utilities has been codified in Section 6 of the Electricity Act of 2003 (Electricity Act 2003, 2003). The grid code, supply code and standard of performance (SOP) for quality, continuity and reliability laid by various SERCs mandate power quality to be maintained (section 86 of Electricity Act 2003).

After discussions with distribution utilities, the standard of performance (SOP) determined by the SERCs is constrained by the base performance and the reasonable standard that the utilities can achieve practically. The parameters covered under the SOP include (FOR -Forum of Regulator, 2009)

1. Operation of customer call centre
2. Provision of supply
 - New connection
 - Temporary connection

3. Restoring supply:

- underground cable fault,
- distribution transformer failure,
- Fuse off call,
- Line breakdown, and
- Scheduled outage

4. Quality of Supply

- Maintenance of voltage
- Control of harmonics

5. Meter

- Restoring supply in the event of a burned metre
- Inspecting and replacing metres if a customer has a complaint about metres

6. Reconnection

- Customer bill complaints Resolution of billing complaints; acknowledgement of receipt of customer complaint

7. Consumer service or charter

8. Other Services

- The time for other services from the date of application
- The reading of the consumer's metre
- The change of name
- The change of tariff category
- The decrease in contract demand / sanctioned load
- The closure of an account

The standards of performance regulations also compensate if the DISCOMs do not meet guaranteed performance standards and compensation on a consumer appeal rather than automatic (Prayas Energy Group, 2018, 2021). DISCOMs partly follow the SOP for urban customers (FOR -Forum of Regulator, 2018). Even though rural area SOP is far less quality, still less compliance from DISCOMs SOP Notification & training interaction on CRM researcher with more than 30 utilities in India). DISCOMs cannot improve supply quality in rural areas even concerning the same utility quality standards in urban areas

(Harish & Tongia, 2014). DISCOMs suffer from high network losses, a cross-subsidizing tariff, severe generation shortages and corruption, influencing electrification efforts (N. D. Rao, 2014; Santhakumar, 2008). As the reliable power supply is the next concern, the rural consumers have more electricity cost in terms of alternate power (Kerosene, Battery Back up etc.). Rural consumers, especially the lower poor sector, could not afford reliable power, affecting their access to rural consumers (Sreekumar et al., 2019). The lack of reliable power is a problem to all policies launched by GoI toward electrification (Banerjee et al., 2014; Lok Sabha Secretariat & Standing Committee on Energy (SCOE), 2018).

Customer Relationship Management

Various customer services like metering, billing collection etc., were to be mandatorily provided by Utilities as per SOP (standards of performance) specified by respective SERC (FOR -Forum of Regulator, 2009) in compliance to section 86 of Electricity Act 2003 (Electricity Act 2003, 2003). DISCOMs cannot improve the quality of supply (FOR, 2018). Available data indicate that metering, billing and payment complaints dominate the list (Smart Power India, 2019). The consumer data surveyed by Nhakur et al, for newly connected families, bills are issued with excessive delays, errors, metre issues, and payment challenges (Nhalur, 2018). Delays or mistakes in bills lead to remarkably high bills, which small consumers find tough to pay, thus leading to disconnection (The Hindu, 2019).

Urban-Rural Disparity

The quality of the supply varies between consumers of urban and rural areas (Harish & Tongia, 2014). Supply in rural face more power cuts, “more than they ought to be” (S. R. Khandker, Samad, Sadeque, et al., 2014; S. Khandker & Samad, 2016). The basic premises of regulated utilities are universal obligations meant to serve all consumers in geography (especially those with a regulated rate of return monopoly). Its absence leads to a loss in social welfare transfer from those not served to those served (in terms of access or actual service delivery) (Harish & Tongia, 2014). There is also a disparity in schemes for rural areas, such as schemes like IPDS focusing on IT enablement,

strengthening rural electricity backbone, and reducing losses limited to only urban areas (MoP GOI, 2014). Moreover, capacity building components to meet the above challenges with a budgetary allocation of Rs 1000 million were only limited to urban areas (Lal, 2011; MoP GOI, 2014; PFC Ltd, 2008)

Rural Sub-Transmission and Distribution Network:

Schemes such as the UDAY and R-APDRP (restructured accelerated power development and reform program) envisage a reduction in the AT&C losses. They fail to address the issues of expanding AT&C gaps due to extensive electrification efforts of last-mile connectivity, which they envision as a reduction in AT&C losses (addition of rural consumers) (Niti Aayog, 2017). Rural supply is reckoned as a welfare activity, not a commercial one (Niti Aayog, 2017). Electricity infrastructure in Rural infrastructure (substation, distribution transformers, lines) is significantly poorer than its urban counterpart, leading to more losses in rural areas (NITI Ayog, 2021). Electric utility losses are commonly expressed in Aggregate Technical & Commercial Losses, i.e. AT&C (CEA, 2016; National Power Portal, 2019). Rural Distribution covers more than 70% of the geography of any DISCOMs, and Rural AT&C Losses significantly affect the financial health of DISCOMs (Livemint, 2018; MoP GOI- RDS Scheme, 2021; MoP GoI, 2021). The losses are an opportunity missed in terms of capacity utilisation (Carter-Brown & Gaunt, 2019). Improvement of sub-transmission and distribution network of rural distribution will make the rural distribution economically viable for retail competition like separation of carriage and content (Neetima Agarwal, 2015; Niti Aayog, 2017; Swain et al., 2019).

Not All Households Use Electricity

According to the study by Smart Power India (Smart Power India, 2019), out of 10,049 households in 200 villages, a significant number of homes (17%) remain unelectrified, and a majority of these are rural poor and rural lower households.

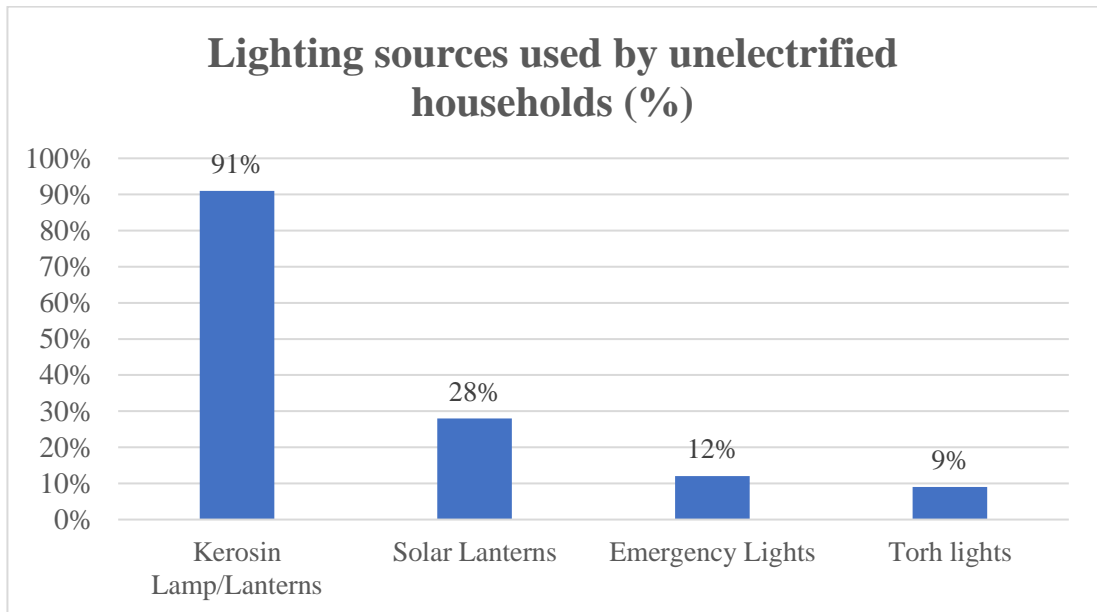


FIGURE 1.5: LIGHTING SOURCES USED BY UNELECTRIFIED HOUSEHOLDS (%)

Source: (Smart Power India, 2019)

States that use grid electricity more frequently, like Odisha, have little need for kerosene, a polluting and unsafe fuel, as a source of lighting than states with low adoption of grid electricity (Smart Power India, 2019).

**Rural Electrification Addressing Sustainable Development Goal 7 (SDG7)
- Affordable, Reliable, Sustainable and Modern Energy for All:**

In 2016, more than 781 million people, or 39% of the world's population, have no access to clean fuels and cooking technologies (UNDP, 2021). Addressing SDG 7 goal requires understanding the trade-offs and synergies between the potential for sustainability transitions and energy access constraints is required to achieve the energy objective (Nerini et al., 2016).

India has the world's third-largest economy, with a population of 1.3 billion, about 20% of the global population. However, it only consumes 6% of the world's primary energy (OECD, 2011), and 240 million Indians lack access to electricity (IEA, 2015).

From 2010 to 2016, the annual primary energy intensity improvement rate accelerated in 16 of the world's 20 most energy-demanding economies. China made the most significant progress, followed by India, Indonesia, Japan, and the United Kingdom. As a result, the energy intensity improvements projection is,

on average, 2.4% per year between 2017 and 2030 (IEA et al., 2019). Thus, more availability of electricity is needed to sustain the energy intensity improvements.

To increase access to clean energy, it is essential to increase energy efficiency and make investments in renewable energy. 72% of the increase in energy consumption from modern renewable sources between 2010 and 2016 came from developing regions, including India. Although one of the solutions to the world’s climate crisis lies in renewable energy, the penetration of this clean energy is still to be achieved.

India is boosting the share of renewables in India’s energy mix (SDG 7.2), stepping up efforts to provide universal access to modern energy forms (SDG 7.1), and improving energy efficiency (SDG 7.3) by providing subsidized LPG (Liquefied Petroleum Gas) as an interim cleaner (Smith, 2016) substitute for traditional and dirty fuels (firewood, charcoal, crop residues, and dung) (Bonjour et al., 2013) for cooking and heating (Mccollum et al., 2017). The use of clean fuels is an essential step in the transition to modern, reliable energy sources (SDG 7) (Rosenthal et al., 2018).

Post 100% Rural Electrification Challenges To DISCOMS:

DISCOMs face various technical, financial and institutional challenges related to the post-100 % rural electrification scenario (Gill et al., 2019). Researchers have compiled tri-challenges related to post- rural electrification in India as detailed below

TABLE 1.3: RURAL ELECTRIFICATION CHALLENGES TO INDIAN DISTRIBUTION UTILITIES

<p>Technical Challenges</p>	<p>Keeping technical losses down</p> <ul style="list-style-type: none"> • Maintaining a network with current human-resource capacities is difficult. • Increased occurrence of theft on a large network • Consumers' lack of energy-efficient practises
<p>Financial Challenges</p>	<ul style="list-style-type: none"> • Ensuring revenue sustainability • Managing an expanded and new network (metering, checking theft, and quality supply)

	<ul style="list-style-type: none"> • Ensure prompt billing and collection • Because new customers are mostly from rural areas, revenue recovery may be a challenge. • The actual cost of serving such connections exceeds the revenue generated. • Consumer affordability levels • Consumer awareness (they seem to believe that even the service is free)
Institutional challenges	<ul style="list-style-type: none"> • Curbing/reducing AT&C losses post SAUBHAGYA through Reform schemes like UDAY intending to reduce AT&C losses to 15%. • Human resource Management • Pressure on existing capacity to manage a larger, more widespread network • Some DISCOMs lack an organized/effective IT system for proper governance and monitoring. • Skewed LT:HT consumer ratios have a long-term impact on DISCOM's viability and performance.

Source: Compiled by Researcher

Reference: (Forum of Regulator), 2016; Gill et al., 2019; NITI Ayog Govt of India, 2019)

In India, RAPDRP and IPDS were launched to improve system efficiency and reduce AT&C losses focusing only on urban areas (PFC, 2008; Lal, 2011; IPDS, 2014). However, the UDAY scheme (profiled for Financial Restructuring and AT&C loss reduction of DISCOMs) fails to expectations (Downtoearth, 2019; Financial Express, 2017). Therefore, there is a need for a rural policy to meet DISCOMs challenges post 100% rural electrification (The Hindu, 2019).

Skilled Manpower to Meet DISCOMS Challenges:

There was a persistent lack of training infrastructure, comprehensive training practices, and a skilled workforce to meet DISCOMs challenges (Roy & Verma, 2016; Dr Abiola-Falemu, & Oseghale, 2015; Working Group on Power Planning

Commission, 2007, 2012). DISCOMs require skilled manpower to improve performance in loss reduction and provide reliable power on a sustainable basis (Gidey, 2016; Sethi, 2018; Shirley, 2018; Munasinghe, 2019). The energy dilemma of reliable and affordable power access demands skilled workforce deployment (Energy, 2011). The skilled workforce can fully understand the issues associated with network strengthening, operation, and maintenance and identify solutions to resolve them quickly and professionally (ILO Geneva, 2010).

1.5 BUSINESS PROBLEM

Standing committee on energy evaluation of RGGVY programme (2013), PEO evaluation of the RGGVY programme (2014), and CAG (Comptroller and Auditor General) evaluation of the RGGVY programme (2014) highlight the challenges regarding universal access, reliability, affordability, and inferior consumer service (CAG, 2013; SCOE Lok Sabha, 2013). Therefore, there is a need to integrate lessons learnt from the past and the solution implementation in the electricity reports (Ann & Sreekumar, 2019) toward increasing universal access.

Rural Electrification Trilemma

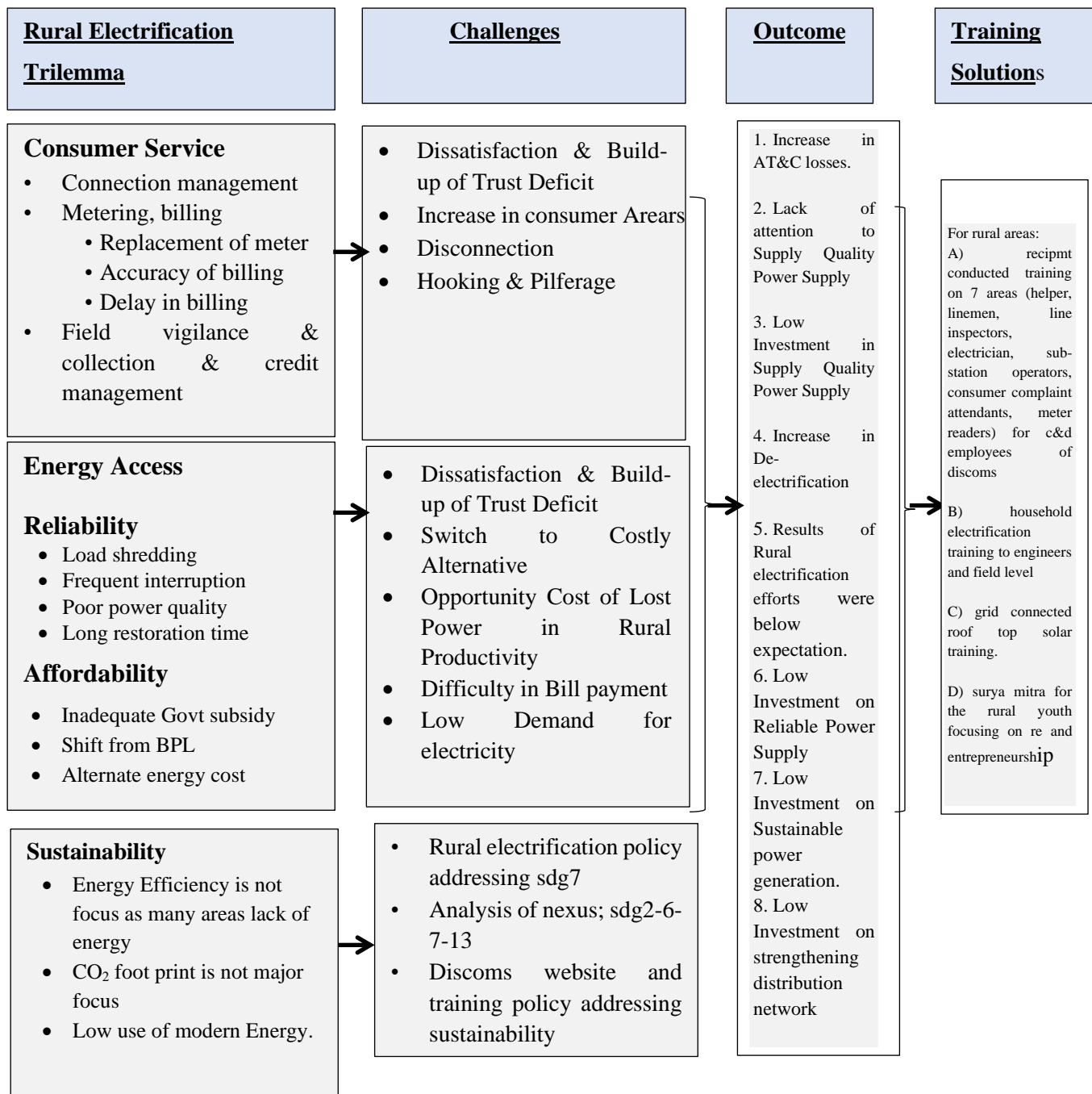


FIGURE 1.6:RURAL ELECTRIFICATION TRILEMMA OF INDIAN DISTRIBUTION UTILITIES

Source: Compiled by the researcher.

(Ref: Banerjee, Barnes, Singh, Mayer, & Samad, 2015b; FORUM OF REGULATOR, 2016; Kamalapur et al., 2011; S. Khandker et al., 2012; Nhalur, 2018; SCOE Lok Sabha, 2013)

Since independence, many schemes for rural electrification have been launched like KJY, RGGVY, DDUGJY and SAUBHAGYA, costing approximately 1000 billion Indian (Rural Electrification Programmes, Ministry of Power), whereas the return of investment is of leading desire effect of universal access (Manabika et al., 2019; Niti Ayog & CRISIL Infrastructure Advisory, 2019). Moreover, the investments have opportunity costs on one side for utilities and governments (Carter-Brown & Gaunt, 2019) and have an opportunity cost in terms of alternate energy access for the consumer (International Energy Agency, 2017; S. R. Khandker, Barnes, & Samad, 2012). The delay in access to reliable energy supply also has implications for missed opportunities for power utilities and DISCOMs (Carter-Brown & Gaunt, 2019; NITI Ayog, 2021; SmartPower India; & NITI Ayog, 2020). Moreover, due to the increased cost of service for DISCOMs to provide reliable electricity for rural electrification and the additional cost of accessing alternate energy options like biomass, kerosene etc., the energy cost is becoming higher for rural consumers rendering it unaffordable for the poorest segment of the rural population (Gill et al., 2019; Laan et al., 2019). This also prevents the clean energy transition aspiration of India. Therefore, this rural electrification trilemma is a barrier to India achieving its INDC target of GHG emissions and zero-emission by 2070 (MNRE, 2020).

Rural Electrification in Synergy to Energy Nexus Addressing SDG7

Energy is a necessary element for many of the essential things that individuals are entitled to (Jones et al., 2015). With increase in global populations, the need of more food production necessitated the need for more water which further increased need for energy (Roper, 2020; Santhosh et al., 2014). As a critical enabler for the sustainable development goals (SDGs), energy has positive impact in increasing productivity, economic and social development. It enhances human life in terms of economic growth, food production, healthy lifestyles, education, gender equality and empowerment, health & hygiene (water supply and sanitation), as well as employment (UNDP, 2016). The UN 2030 agenda and its 177 sustainable development goals emphasise how crucial it is for policy and planning at the global level to adopt a nexus approach (Griggs et al., 2013; UNDP, 2015). The control/dependence links between particular sectors change

in strength or weakness as a result of the nexus effect (Painuly et al., 2021). It requires a lot of water and energy to produce food, and even more, energy to get the water to the food and distribute it. The complex interlinkages of food and water nexus begin to take shape as a result of the fact that food and water are both sources of energy (ethanol made from corn and hydropower, respectively). Additionally, as demand rises, there is more competition for resources among water, energy, and agriculture, making integrated resource management even more crucial (Fabiola & Dalila, 2016). Few such energy nexuses related to rural electrification are as follows:

Energy-Water Nexus

The energy-water nexus is a system composed of two infrastructure systems: one with the artefacts required to describe the entirety of the energy value chain, and the other with those required to describe the entirety of the water value chain (Santhosh et al., 2014). Recent studies on smart grid operations necessitate rebalancing the portfolio of power generation technologies (Niti Aayog; The World Bank, 2019). Electricity is linked in all three area of water – production, transportation and consumption (Hamiche et al., 2016). India's labour force, which makes up 56.66% of the country's overall population, uses 90% of the nation's freshwater resources and consumes 17% of its total power (Ministry of Statistics and Programme Implementation, 2011; MoF GoI, 2021; World Bank, 2016). Solar energy groundwater pumping has less cost than DISCOMs energy charge making solarization of agricultural pump profitable (Milman et al., 2018).

Water, Energy and Food (WEF) Nexus

The evaluation of trade-offs between the water, energy and food is necessary to address issues related to availability of energy for increasing availability of water and food for people (Simpson & Jewitt, 2019). Increased water demand for agriculture leads to more water, and more energy-intensive water desalination plants are used to produce drinking water and irrigation, which could reduce the amount of water and land available for other uses, most notably for food production (P. Rao et al., 2017). The consequences of widespread use

of chemical fertilisers and pesticides, irrigation water, and power subsidies are being felt in Punjab as dwindling aquifers, deteriorating soil quality, polluted rivers and groundwater, an increase in cases of health risks in farming communities, and the extinction of biodiversity (CGWB, 2010). Gujarat has limited water and land resources per person; nevertheless, the Jyotirgam scheme for better electricity access for homes and irrigation (water pumping) has greatly decreased over-exploitation of groundwater. This programme has improved Gujarat's GDP growth and increased food and energy security (FAO UN, 2016).

Water, Energy, Food and Income Nexus

The sustainable development goals (SDGs) can be coherently targeted through new forms of stakeholder collaboration, notwithstanding the integrated landscape approach's limitations (Bürgi et al., 2017; Reed et al., 2016). Platforms that handle planning challenges related to climate change, food security, biodiversity conservation, include layered processes that go from the international level all the way down to the local level (van Noordwijk et al., 2018). For instance, the energy demand for agricultural irrigation in the Spanish water sector increased significantly which increased income (Hardy et al., 2012). Similar to vertical farming, agrivoltaics (Barron-Gafford et al., 2019) and aquaponics (Sace & Fitzsimmons, 2013) vertical farming are alternative production systems even in urban settings.

Rural Sub-Transmission and Distribution Network Commercial Viability

Strengthening rural distribution networks is required to minimise AT&C losses (Kaushik & Singh, 2017; Paul & Tyagi, 2021) to make it commercially viable. DISCOMs currently reckon rural supply as a welfare activity and not a commercial one (Niti Aayog, 2017). There has been a need to improve rural infrastructure in the last 50 years (Mazur et al., 2019; Samanta, 2015). There is a requirement for skilled manpower in the rural sector, especially for rural electrification works (Pargal & Ghosh Banerjee, 2014; Power Today, 2016). The missed opportunity to serve the consumer reliably has an opportunity cost on the distribution assets (Carter-Brown & Gaunt, 2019).

Training Framework of DISCOMS, Training Investment and Its Return

DISCOMs require skilled manpower, a comprehensive training policy and infrastructure to improve performance in terms of loss reduction and to provide reliable power on a sustainable basis (Gidey, 2018; Munasinghe, 2019; Rebekh, 2018; Sethi, 2018). There has been investment in training of employees DISCOMs. However, the training infrastructure is far below the global level and even far inferior compared to national-level power sector companies such as NTPC, Power Grid etc. (CEA, 2010; Gill et al., 2019; Kumari, 2017; MoP GoI, 2002; Rajesh et al., 2011; D. V. Rao, 2012; Shahi, 2007). The significant investment in DISCOMs training comes from training expenditure on rural electrification programmes, i.e. RGGVY, DDUGJY etc. (Kamalapur & Y, 2011; REC, 2005). There is an investment from DISCOMs directly in the capacity building of employees of DISCOMs (Shahi, 2007; Vishwakarma & Tyagi, 2016). “An Investment in Knowledge Pays The Best Interest” was said by Benjamin Franklin (Egbert, 2019) and justified best by measuring the return of investment (ROI) (Barrett & O’Connell, 2001; McDonagh, 2016; Varghese & Manoj, 2013). The training policy of DISCOMs does not incorporate any framework to evaluate the training return on the investment made through various government programmes and its own (Bhupinder, 2015; Khan, 2019; Nathan & Scobell, 2012; Research, 2011; Roy & Verma, 2016). The Department of Public Enterprise (DPE) guidelines for PSUs incorporate training effectiveness (DPE, 2011). However, various studies on training evaluation in Indian PSUs indicate that measurement of training was up to the reaction level of Kirkpatrick, and there is no framework for measuring effectiveness in terms of return of investment on training (Dwevidi & Ladiwal, 2011; Ghosh et al., 2011; Gupta & Agarwal, 2018; D. V. Rao, 2012). Even though training effectiveness by measurement of ROI is quantitative and thus more meaningful than qualitative measurements of reaction (Barrett & O’Connell, 2001; Black & Lynch, 1996; Huselid, 1995), there is an absence of practice or framework for measuring ROI of training invest in DISCOMs (Bhupinder, 2015; Dwevidi & Ladiwal, 2011; Gupta & Agarwal, 2018). *The measurement of ROI evaluates the effectiveness of the training programme of DISCOMs* (Lynch et al., 2006; Phillips, 1998) *towards achieving it is objective, i.e. the objective of solving*

DISCOMs energy dilemma of reliable and affordable power access (Josey et al., 2018; Nhalur, 2018; Niti Ayog, 2020). *Absence of framework of rural electrification for measuring effectiveness of training in terms of ROI of training in DISCOMs is an opportunity loss for improvement of skills in effectively utilising investment made in training* (Bishop & Kang, 1996; Black & Lynch, 1996; Lynch et al., 2006; Varghese & Manoj, 2013; Khan, 2019).

Based on the above points, the researcher can state his business problem as follows:

“Lack of ROI based training effectiveness framework of RE Training in DISCOMs is leading to opportunity cost in Indian Power Sector.”

1.6 JUSTIFICATION FOR THE BUSINESS PROBLEM

The justification for the business problem is presented in Table 1.4

Table 1.4: Justification to Business Problem

S. No	Author	Detail
i.	NITI AYOOG Govt of India, 2019	Due to more ACS & ARR gaps leading to cash shortage, DISCOM’s transmission and distribution (T&D) losses increased and less focus on capacity building, and workforce training towards organizational results
ii.	Niez, 2010; Banerjee et al.,2015; Schaefer, 2015; Roy & Verma, 2016; The Hindu, 2019; Fncancial Exress, 2019.	Universal access to a reliable and affordable power supply can justify the huge public investment in rural electrification over the decades.

iii.	Bassi et al.,2000; B. Pfau, and Kay, 2002; Al-Ajlouni et al., 2010.	Evaluation of the effectiveness of the existing training program is required to identify the ROI
iv.	Vishwakarma and Tyagi (2018); Rebekh Shirley (2018); Tyagi and Vishwakarma (2017); Diamantidis & Chatzoglou, (2014); Working Group on Power Planning Commission (2012); Working Group on Power Planning Commission, (2007),	Strategic TNA and evaluating ROI can fill the skill gap in the Indian power utility sector.
v.	Peter J (2009); Dutt D’Cunha (2019) Samanta, (2015); Power Today, (2016); Sethi (2018); Swain et al. (2019); Gill et al. (2019)	Skill development is a need of the hour for India's power sectors to provide electricity access 24x7 to manage the challenges of rural electrification to provide an affordable and reliable supply
vi.	Mazur et al., (2019; Munro, van der Horst, & Healy, (2017); Nirula, (2019); Rehman, Sreekumar, Gill, & Worrell, (2017); Rosenthal, Quinn, Grieshop, Pillarisetti, & Glass (2018); The Economic times, (2019)	There is a lack of access to affordable, reliable power to attain the sustainable goal (SDG7)
vii.	Jack J. Phillips, 1392; Lynch, Akridge, Schaffer, & Gray, 2006. Ann Josey, Shantanu Dixit, Aswini Chitnis, 2018;	The measurement of ROI evaluates the effectiveness of the training programme of DISCOMs towards achieving its objective

	Gill et al., 2019; Nhalur, 2018; NITI AYOJ Govt of India, 2019; Rehman, Sreekumar, Gill, & Worrell, 2017	of solving DISCOM's energy dilemma of reliable and affordable power access
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1.7 SIGNIFICANCE OF THE STUDY

The study by the researcher to look into the problem of connection to all to access affordable, reliable power supply for rural electrification will have more impact on distribution companies to address the problem. Therefore, one of the fundamental ways to handle the problem is capability building distribution manpower to meet the challenge stated in rural electrification impact distribution companies. (Gill et al., 2019).

Improvement of Losses and Financial Health of DISCOMs

DISCOMs have an average cost to serve (ACS) that is far less than the revenue (price) it earns (Paul & Tyagi, 2021; Press Report MoP Govt of India, 2013; Uday Portal Govt of India, 2019). ACS-ARR Gap, if calculated, shall be worse for rural consumers where ACS is more than ARR (CEA, 2017). DISCOMs' Capability to provide reliable quality power to rural consumers will increase once DISCOMs manage their Average cost to serve (ACS) by reducing AT&C losses (MoP GOI- RDS Scheme, 2021; Paul & Tyagi, 2021). Current AT&C Loss for Indian DISCOMs is hovering at 21.4% (Uday Portal Govt of India, 2019), which is much higher than the global level. Despite, Govt of India has pumped more than ₹7000 billion towards the financial improvement of DISCOMs attests to the significance of improving DISCOM's financial health (NITI Ayog, 2021)

Improving Viability and Commercial Operation of Rural Distribution Paving Way for Rural Development and country's GDP Growth

Rural supply is considered more as a welfare activity rather than a commercial one (MoP GoI, 2021; Niti Aayog, 2017). Viable rural supply will enable

distribution companies to retail electricity commercially, a requirement for proposed reforms towards retail competition like carriage & content (NITI Ayog, 2021). Moreover, efficient rural distribution is essential for increased adoption of electricity at personal, agriculture, and community levels, leading to rural and national development (S. R. Khandker, Samad, Ali, et al., 2014).

Overall Capacity Building of Distribution Utility in Managing Changes towards Reforms

The capability-building initiatives of DISCOMs will affect building a skilled team and vibrant organization. Companies with well-trained & developed manpower are more adaptable to changes (Roy & Verma, 2016; Tariq & Muhammad, 2011) and can effectively manage upcoming reforms like retail competition (Draft Electricity Act 2003 Amendment Bill, 2020, 2020; NITI Ayog, 2021). Moreover, the capacity building of DISCOMs will help to quickly embrace future technology like smart meters, IoT, etc., making DISCOMs more efficient and cost-effective. The reforms of DISCOMs are aimed toward creating an efficient retailer facilitating clean energy transition and zero emission.

Thus, due to a lack of skilled manpower, there is opportunity loss in terms of delay in implementing a rural electrification project resulting in cost escalation and inability to supply power to rural areas.

1.8 ORGANIZATIONAL SCHEMATA OF REPORT

The present work is organized into five chapters. The first chapter, 'Introduction and Background,' discusses the business problem of rural electrification training and its scope. The second chapter is about critical review of the literature on rural electrification training. Chapter three describes the research methodology, i.e., review methodology with framework analysis. The conceptual lens was constructed and the interview protocol was developed. The fourth chapter analysis of the interview together with findings and discussions in order to develop the framework. The final chapter concludes the final ROI-based framework for rural electrification training in DISCOMs.

- The first chapter introduces rural electrification and rural electrification training and derives business problems by presenting several facts and figures. Then, the chapter presents the need and significance of the research.
- The second chapter does literature review with selected literature through screening, retrieval and in-depth analysis. The selected 343 literatures were critically reviewed through thematic analysis. Three themes and theoretical underpinning were identified. Then, the chapter derives the research gap through the funnel approach. On the basis of the research gap, the research question and objective are formulated in the chapter.
- The third chapter is about the research methodology of the study, i.e., review methodology and framework analysis, to answer the research question. The existing 343 literature was narrowed down to 43 documents through the review process and further quality validation through MMAT Tool. The conceptual lens was made from this reviewed literature. The operating definition for the present study is also included in this chapter. The chapter used framework analysis includes research methods. In addition, review methodology was used to develop a conceptual lens.
- The fourth chapter develops the framework from the findings—the first part of the chapter analyses interviews with framework methodology and

presents its findings. Then, the chapter presents discussions that led to the framework's development.

- This report's fifth and final chapter presents a proposed ROI-based framework for rural electrification training in DISCOMs. Finally, the chapter completes the report by presenting the study's conclusions, implications, and limitations.

1.9 SUMMARY

- Rural electrification is paramount to the country's growth as a significant population lives in rural areas. The rural electrification initiatives of Govt of India started during the 1960s. With an investment of more than ₹3000 billion in the schemes, Govt of India has achieved 100% village electrification on 28-Apr-2018 and 99.9% household electrification on 31-Mar-2021.
- This achievement in rural electrification did not increase electricity use in the rural area as reliability remained an issue. The poor quality of electricity, frequent outage and extended outage hours of rural supply was a crucial barrier in moving from “connection to all to power to all”. Therefore, the benefit of rural electrification could not be achieved without providing an affordable, reliable, and sustainable electricity supply to rural areas.
- The DISCOMs in India are responsible for the unreliable and low quality of electricity for rural electrification. The financial health of DISCOMs has been a problem for many years with their loss-making balance sheet being affected by the political economy of DISCOMs and the AT&C loss in recovering ACS-ARR Gap etc. DISCOMs provide rural supply more of a welfare basis than commercially using cost-reflective tariffs.
- Govt of India had invested more than ₹3000 billion in rural electrification. Schemes like RGGVY and DDUGJY had an expenditure of capacity building of DISCOMs towards building a skilled workforce to handle DISCOMs’s challenge of post 100% electrifications. The expenditure on

training in DISCOMs happened through the various GoI Schemes, such as the National Training Programme under DDUGJY (₹1500 million) and the self-Finance of DISCOMs. Despite training investment in DISCOMs through RE Schemes, DISCOMs have rural electrification trilemma in providing affordable, reliable and sustainable power to rural consumers, providing customer service to rural consumers.

- Studies revealed that there is absence of any training effectiveness measurement of rural electrification training in DISCOMs for training sponsored by GoI schemes or self-financed.
- The above point leads to “Lack of ROI based training effectiveness framework of RE Training in DISCOMs is leading to opportunity cost in Indian Power Sector” is identified as business problem for the present study.
- The above business problem is significant as i) Despite Govt of India has pumped more than ₹7000 billion towards the financial improvement of DISCOMs, most of DISCOMs are loss-making and could not focus on investment to increase sales of power in rural India or even on the training of human capital for profitability ii) Improving viability and commercial operation of rural distribution is important for rural development and national GDP iii) Overall capacity building of distribution utility in managing changes towards reforms efficient, a competitive retailer promoting zero emission in rural areas.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

This chapter presents a thematic literature review on the keywords from the purpose statement to identify the research themes and underpinning theory. The researcher has established a justification for identified themes and underpinning theory, followed by a theme-wise discussion of reviewed studies. Next, the thematic and theoretical research gap (s) are consolidated following the funnel approach (Roller, 2016) to derive the research gap. Finally, the research gap is critically analysed to derive the research problem, research questions, and research objectives following the approach adopted and expanded by Miller, (2009).

2.2 LITERATURE REVIEW

The literature review is to discover relevant material published in the chosen field of study and search for a suitable problem area. Thus, the researcher synthesizes existing literature to address the research gap in the existing body of knowledge, justifies the research problem by adding value to existing knowledge, and validates the research methods and approaches (Machi & McEvoy, 2016; Okoli & Schabram, 2012). The literature review synthesises the existing literature in the subject field (Snyder, 2019) to help researchers understand the subject's existing knowledge. The objective of the literature review is to summarize the state of the art in that subject field, synthesize earlier and recent work, and collect data to form the conceptual lens (Luiz & Polytechnic, 2014; Sally, 2013; Sharif et al., 2019). Fox (1969) mentions two kinds of literature that should be reviewed (David J. Fox., 1969). The first is

‘conceptual literature’. This is written by subject matter experts giving opinions, ideas, theories or experiences and published in books, articles and papers. The second is "research literature," which presents the accounts and findings of previous research on the topic and is frequently offered in the form of papers and reports (Shore, 1969).

The study researcher has undertaken “Effectiveness of Rural Electrification Training in India”. The problem statement or business problem was obtained from various reports and research papers suggesting “Lack of ROI based training effectiveness framework of RE Training in DISCOMs is leading to opportunity cost in Indian Power Sector.” The researcher first read from secondary sources to get an overview of the topic. The researcher had worked in rural electrification and training, which helped to identify various reports from the Ministry of Power, Central Electricity Authority, Rural Electrification Corporation and other reviews on rural electrification for building.

The researcher used the keyword search method. The researcher Identified six keywords from the problem statement (Business Problem). The six keywords are Keyword 1: Indian power sector, Keyword 2: Rural electrification, Keyword 3: Rural electrification training, Keyword 4: Training effectiveness, Keyword 5: Framework of training, and Keyword 6: ROI of training.

Keyword Search:

With over half a billion active websites and academic databases with hundreds of millions of entries available for search, searching literature with keywords avoids wasting time capturing accurate and relevant data for literature review (Siddiqi, 2015). Thus, the keyword for searching manuscripts is a practice adopted in many research (preliminary relevance as determined by title) (Xiao & Watson, 2017). The author identified six keywords from the business problem to identify literature for critical review.

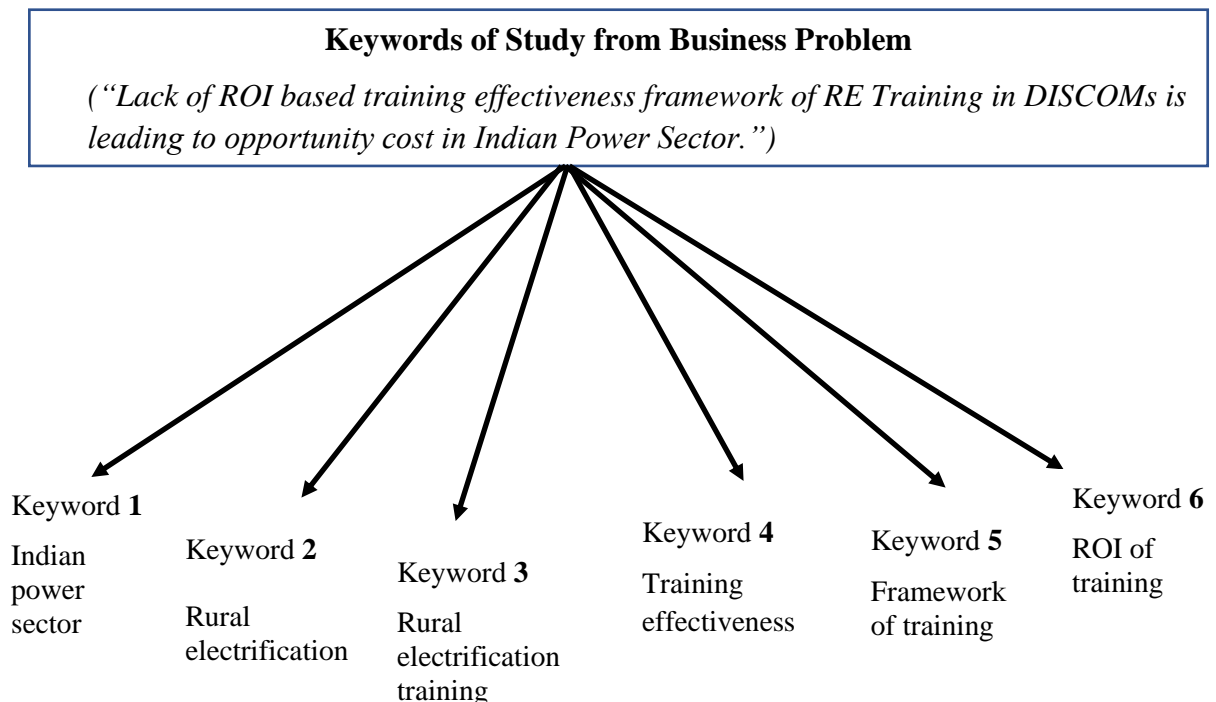


FIGURE 2.1: KEYWORDS FOR LITERATURE REVIEW

Following the various literature available on literature review (Department of Sociology Harvard University, 2015; Onwuegbuzie & Frels, 2016; Sage Publications, 2018) and application of critical review of the literature (Brooks-Russell et al., 2015; Carnwell & Daly, 2001; Mallett, 2004; Shreve-Neiger & Edelstein, 2004), the process of a literature review undertaken by the researcher is as follows

- The researcher searched the databases of scopus and web of science with the keywords. A total of 18060 publications were identified in the first search, which was screened in the light of the inclusion and exclusion criterion and further for duplicity to reach 540.
- The study's relevance (Madi et al., 2019; Robinson, 2014) was based on
 - location and context – The reports and studies related to India were considered.
 - Publication date- The papers before 2000 were not considered except for the theory of effectiveness and rural electrification efforts.
 - Scope of studies- studies which only address part of the business problem.
- These 540 documents were assessed by title review, abstract review and 343 documents selected.
- The researcher studied these 343 articles and was reviewed for their objective, research methodology, findings, theme, research gap, and theoretical premises. The themes and theoretical underpinning were identified and justified for this study's identified themes and theories (Chris, 1998; Ridley, 2012; Sutton, 2016).
- A critical literature review was done to find thematic gaps and theoretical gaps (Batra, 2021; Sharif et al., 2019; D. Taylor, 2019).
- The thematic and theoretical gaps were consolidated following a funnel approach to obtain the research gap (Roller, 2016).
- The research problem was derived from the research gap, and the research objective for the study was constructed (Ali, 2022; Mattick et al., 2018; P & C, 2007). The flow chart showing process of a literature review undertaken by the researcher is detailed in Figure 2.2

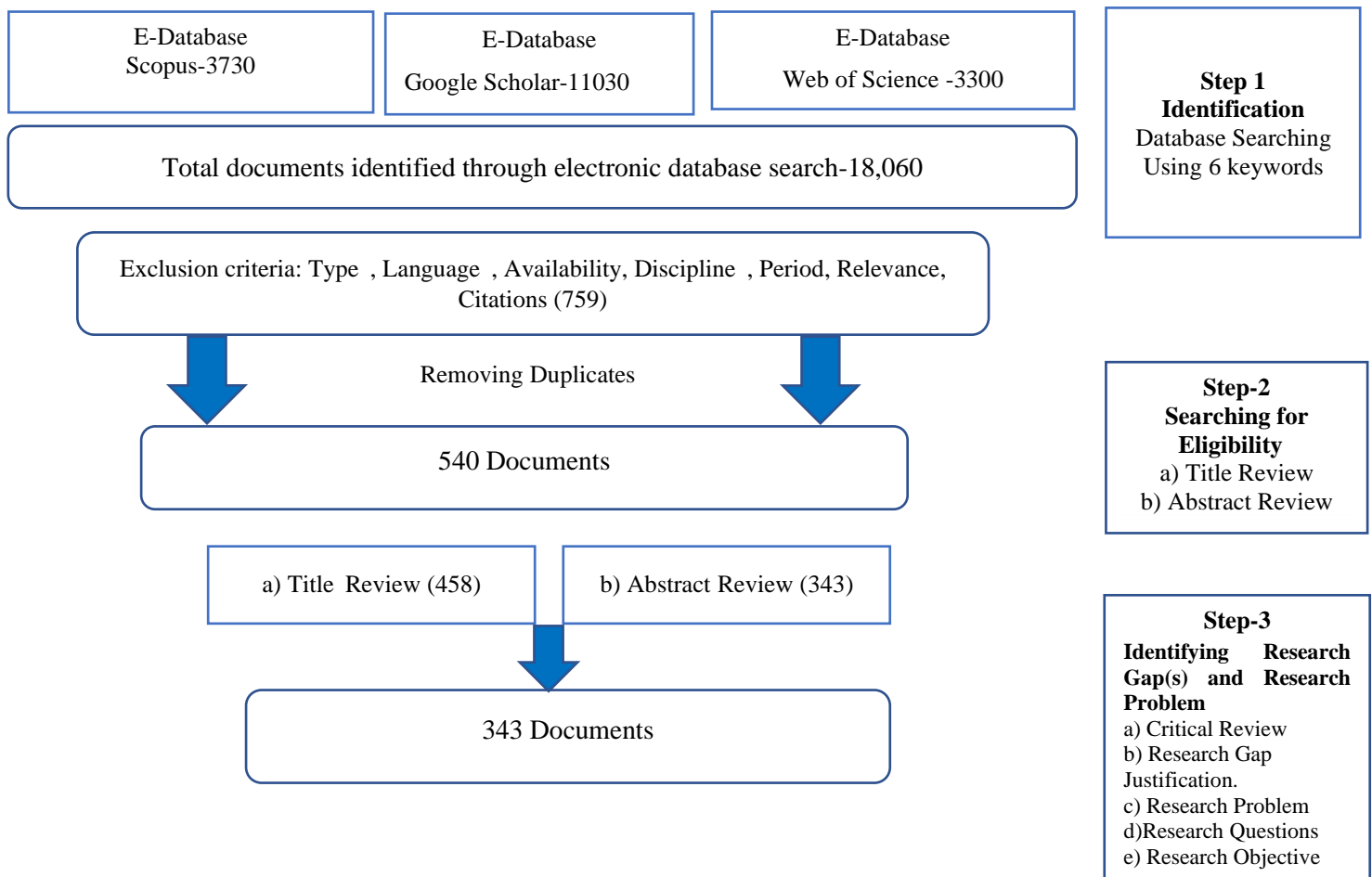


FIGURE 2.2:LITERATURE REVIEW PROCESS AND FLOW CHART

LITERATURE REVIEW ON IDENTIFIED THEMES

The previous section analysed literature for its latent concept, i.e. theme (Vaismoradi & Snelgrove, 2019). Data's subjective meaning and cultural-contextual message are referred to as "theme." A theme can be created by combining cognitive captures with common points of reference, high transferability, and the ability to unify concepts across the research phenomena. In other words, a theme is a red thread of underlying meanings that may be used to connect comparable bits of data and help the researcher answer the question "why?" (Carnwell & Daly, 2001)

The research theme helps us to identify what the research paper conveys. The themes were assigned to the study by carefully analysing its content, objectives and related data. Research theme has different uses depending upon the

requirement of the researcher. A theme can clearly state the implication, working, and area studied (Nowell et al., 2017; Oscar Labra, Carol Castro, 2019)

A short interpretation can be drawn with the help of the theme, and thus, the paper can further be studied if relevant to the reader. A crucial role of a research theme is to find a research gap in a study. After specifying themes from the previous literature, relevant pieces of literature were considered. Then, this literature was studied for reference purposes, and the research gap was analysed (Batra, 2021; Erlingsson & Brysiewicz, 2013; Morgan, 2018; Vaismoradi & Snelgrove, 2019)

While assigning themes to previous literature during the literature review, many themes were identified in this study. However, only three themes are found relevant to our study.

Thus, the research theme in this study revolved around rural electrification, the effectiveness of training and return on investment.

Theme 1- Rural electrification training in Indian DISCOMs

Theme 2- Framework for effectiveness of training in DISCOMs

Theme 3- Measuring method of return on investment (ROI)

Identification of Theme 1: Rural Electrification Training in Indian DISCOMs

The literature review captured the rural electrification training in Indian DISCOMs from keywords 1, 2 and 3.

For analysing keyword 1, we studied 125 articles covering different objectives and findings of research methodology, research gaps and theories. Themes like universal electrification, training in DISCOMs of rural electrification, rural electrification in India and study of reforms in rural electrification formulated in 64 rural electrification-related documents. Similarly, from keyword 2, we studied 193 articles, out of which 97 were related to rural electrification. Themes like renewable energy for rural electrification, Feasibility assessment for off-grid rural electrification, rural electrification and its impact on socio-economic and environment, training imparting to relevant persons in rural

electrification and training impact of rural electrification convey the need to study rural electrification training in Indian DISCOMs. In keyword, out of total studies, 21 articles depicted the importance of rural electrification training in Indian DISCOMs. All these articles from three keywords aided in formulating the theme, “*Rural Electrification Training in Indian DISCOMs*”.

Justification of Theme 2

TABLE 2.1: RELEVANT STUDIES JUSTIFYING RESEARCH THEME 1

Themes	Relevant Studies Justifying Identified Research Themes
Rural electrification training in Indian DISCOMs	Abul Barkat et al, 2002; Johansson, Thomas B, 2002; A.K Panda, 2004; Birol et al 2014; Vijay Modi, 2005; Bradbrook Bonython, Adrian J, 2005; Bastakoti & Badri Prasad,2006; Andreas Kemmler, 2007; Mr. Rajiv Kurulkar, 2008; Sadhan Mahapatra et al 2009; Germa Bel and Jaon Calzada, 2009; Peters & Jörg Jorg, 2009; Ulsrud et al, 2011; Taryn Dinkelman, 2011; Hirashima, S., Oda, H., Tsujita, Y. 2011; S. C. Tripathy & Tripta Thakur, 2012; Khandker et al, 2012; Jean Drèze and Amartya Sen, 2013; Sunil Upadhyay, 2013; Sunil Singh, 2014; Harish & Santosh, 2014; Pargal, Sheoli 2014; Khanna et al, 2014; Gopal Krishna Sarangi, 2015; Kulkarni & Sanjeev H, 2015 ; International Energy Agency Report (IEA) 2015; Banerjee,2015; Shahidur R. Khandker and Hussain A. Samad, 2016; Bosco Astarloa et all, 2016; FOR (Forum of Regulator), 2016; Elizabeth Chatterjee, 2017; Amer Ait Sidhoum & Teresa Serra 2017; Daljit Singh, 2017; NITI Aayog, Government of India 2017; Ganguly et all, 2017 ; Vikas Srivastava, 2017 ; Munro et al 2017; Rehman et al, 2017; Ann Josey, Shantanu Dixit, Aswini Chitnis, Ashwin Gambhir 2018; Chirambo, Dumisani 2018; Njiru et al, 2018; Rebekh Shirley, 2018; Büyüközkan et al, 2018; Jaideep Mukherji, 2018; Ashok Sethi, 2018; Rosenthal et al, 2018; Rajiv Kurulkar,2019; Kshama V Kaushik, 2019; Kundan Pandey, 2019; Ashwini K Swain, 2019; Carter-Brown, 2019; Mohan Munasinghe, 2019; Bhasker Tripathi, 2019; Jaideep Mishra, 2019; Gang He, 2019; Jannic Horne, 2019; Barron-Gafford et al, 2019; Sovacool et al, 2019; Rosati et al, 2019; Almeshqab & Fatema, 2019; Ike et al, 2019; Horne et al, 2020

Identification of Theme 2: Framework for Effectiveness of Training in DISCOMs

Training is an important activity to increase the efficiency of its workforce. Various literature reveals the positive impact of training on the institutional building of the organisation to meet challenges. Training can help DISCOM employees to meet the challenges of DISCOMs to distribute the energy efficiently and effectively (BAGUL, 2012; Bhupinder, 2015; Gupta & Agarwal, 2018; Paul & Tyagi, 2022). It plays an essential role in rural electrification as DISCOMs are directly responsible for providing affordable, sustainable and reliable power. Moreover, efficient DISCOMs can uplift the whole power sector and turn around the financial system of Indian DISCOMs (Vishwakarma & Tyagi, 2016).

The literature review captured the theme of a framework for training effectiveness in DISCOMs. All the keywords brought up the need for effective electricity distribution utility training. Keyword 1 has 25, keyword 2 has 51, keyword 3 has 11, keyword 4 has 99, keyword 5 has 17, and keyword 6 has 28 related documents to the effectiveness of training. For instance, themes underlined in all six keywords were: Training in DISCOMs of rural electrification, effectiveness of training, the impact of rural electrification, Evaluation of training etc. Training for older workers and management of training, training program effectiveness, training evaluation of formulating training, training effectiveness of workshop on evidence-based attitudes among youth community mental health providers, cross-cultural training effectiveness and training and development in power sector which call attention to the need of studying training effectiveness. This study proposes to look into the effectiveness of rural electrification training and study DISCOMs leveraging the training to build its human capital to meet various challenges associated with rural electrification with the investment made in rural electrification training. This reason supports why the theme “*Framework for Effectiveness of Training in DISCOMs*” is a crucial aspect to study in this research.

Justification of Theme 2

TABLE 2.2: RELEVANT STUDIES JUSTIFYING RESEARCH THEME 2

Themes	Relevant Studies Justifying Identified Research Themes
<p>Framework for effectiveness of training in DISCOMs</p>	<p>W S Blumenfeld; M G Holland, 1971; HARRY C. Traindis, 1977; C Ban & SR Faerman, 1990; Booth, Alison L. 1991; Faerman, S.R. and Ban, C 1993; Bennett & Winston, 1995; Mark A Huselid, 1995; D Kirkpatrick, 1996; Junaidah Hashim, 2001; Deniz Eseryel, 2002; Ibrahim Mohamed, 2004; Kaye Alvarez et al., 2004 ; Christopher F. Bober, Kenneth R. Bartlett 2004 ; McIver Consulting, 2004</p> <p>Ahmed Aldolaimi, 2006; M Reed, J. and Vakola,2006; HyochangLima, Sang-GunLee, KichanNam, 2007; Liu, Jun-E et al.,2007; Becky F. AntleAnita P. BarbeeMichiel A.van Zyl 2008; Herfst et al. 2008; Indira, 2008; Booth et al., 2008</p> <p>Raja Waqas, 2009; Kaminski, Karen, Lopes, Tobin, 2009; Jones, Sarah, Ross, Seamus, Ruusalepp, Raivo, 2009; Srivastava et al, 2009; Qiumei Jane Xu, Jianfeng Jiang, 2010; Chun-Ling Ho & Dzung, Ren-Jye, 2010; Brian D. Blume et al 2010</p> <p>John Edmonds, 2010; Freda Mcmanus et al., 2010; C Cherniss et al., 2010; CEA, MoP, 2010; Pilar et al., 2011; Ritu Narang & Athar Mahmood,2011; Newman et al., 2011; Sheeba Hamid et al., 2011; Atiq Rehman et al., 2011; Tung-Shan Liao et al., 2011</p> <p>Islam, 2011; M.Z. Iqbal et al., 2011; Khan et al., 2011; Hywel Thomas & Tian Qiu,2012; Andrew J. McCarty et al., 2012; Mollahoseini, Ali; Farjad, Shahrooz" 2012; Farjad, S. 2012; Gerald Braun, 2012; Ashleigh, Melanie et al., 2012; Ali Mollahoseini & Farjad, Shahrooz, 2012; Rebecca Saunders, 2012; Ahnate Lim et al., 2012; Mohamed, A.Rasli, A.Mansor, N.N. Abu 2012; Stanhope, Daniel S.; Pond, Samuel B.;</p> <p>Surface, Eric A.2013; Aberash Jenberu 2013; Yen-Chun Jim et al., 2013; Rodriguez et al., 2013; Donovan, J.D., Maritz, A. & McLellan, A. 2013; Atakilt Hagos Baraki & Van Kemenade,</p>

	<p>Everard, 2013; Wen-Yu Zhang & Yan Chen,2013; P.P Kulkarni, 2013; Aidah Nassazi, 2013; Mourad Mansour, 2013; P K Varghese and K X,Manoj, 2013;Nath Upadhyay, 2013; Wenyu Zhang & Yan Chen, 2014; Tassanee Homklin, 2014; Neetima Agarwal, 2014; Jette Ammentorp, et all 2014; Vikas Sahasrabudhe and Shivraj Kanungo,2014; Hasebur Reheman 2014; Kumar, J., Kumar Soni, V. & Agnihotri, 2014; Shakila P. 2014; Ndibe, B.C. and E Campus, 2014; Surbhi Jain, 2015; Sherrie Artman et al,2015; Wolfgang Messner, 2015; Gosim Chukwu, 2015; Shahrizal Badlishah & Abdul Halim Abdul Majid 2015; Wolfgang Messner, 2015; Andreas Hartmann & Andre Doree,2015; Martin G Tolsgaard et al., 2015; Jan C. Frich et al., 2015; Endang Sri Andayani, Sawitri Dwi Prastiti, Ika Putri Larasati 2015; Jain, Sheelam & Jain, Ravindra 2015; W.N Ofojebe & Chukwuma, 2015; Shodeinde, Olubukunola, 2015; Gosim Martin Chukwu, 2016; Aleksandra Cibreva-Jovanovska, Biljana Buzlevski, Aleksandar Dejanovski, Irena Korubin 2016; Jaspreet Kaur, 2016; Chukwu, Gosim Martin, 2016; Soraya Mohammad, 2016; Maiju Myllynen, 2016; Saleh Ardestani et al., 2016; Subhadra Ganguli and Reem Hameed Mater,2016; Chukwu, Gosim Martin, 2016; Mcdonagh, Mary 2016; Ehsan Saeed Idrees Yaqoot, Wan Shakizah Wan Mohd. Noor, Mohd Faizal Mohd Isa, 2017; J.S.Kim, 2017; F. Saeed1 & A. Wall & C. Roberts & R. Riahi & A. Bury 2017; Sujeong Kim, Chang Park, Jennifer O'Rourke, 2017; Hande Kimiloglu, Meltem Ozturan, Birgul Kutlu, 2017; Ehsan Saeed Idrees Yaqoot, Wan Shakizah Wan Mohd. Noor, Mohd Faizal Mohd Isa, 2017; Al-Swidi, Abdullah and Al Yahya, Mohammed, 2017; Amitabh Deo Kodwani,2017; Jasson, Cassandra C, Govender, Cookie M, 2017; Thierry Kangoye, 2017; Bukhari et al., 2017; Athar Mahmood & Ritu Narang, 2018; Roshan Dhakal, 2018; El Baroudi et al. 2018; Al-Mughairi & Aliya Mohammed, 2018; Vincent Rufino, 2021; Lidia Staron, 2018; Ganguly, 2018; Gao et al., 2019; Brixiová, Zuzana, 2019; Honghua et al.,2020</p>
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Identification of Theme 3: Measuring method of return on investment (ROI)

Critical aspect of any business activity is to know whether the subject is worth investing in and what it will be its return on investment. Moreover, if the investment is being made, what will be the framework for an accurate measuring method of return on investment (Schueler, 2016; Teixeira & Pereira, 2015; Vincent Rubino, 2017). The training activity also has an expense and thus a business decision.

As Kearns (2006) revealed, human capital refers to team members' skills, knowledge, inventiveness, capacities, and overall competency. It symbolises employees' things and services that generate revenue when invested in their knowledge, talents, and abilities (Boroujerdi & Khani, 2014).

Keywords 3,4,5 and 6 have themes that underline the importance of ROI in a study. Themes from these keywords were “return on investment”, which is a decisive factor when organizations look to implement training modules. Although many literatures suggest the benefits of training to the benefits or profits in the organisational results, the rate of return on human capital investment in developing knowledge, skill, and other abilities through training are limitations of many research studies.

The Returns to Investment in human resources were problematic due to the availability of framework and data. It is more challenging to capture intangible costs and benefits as data for measuring. In contrast, it is easy to get complex data like profit after tax (PAT), various elements of training programme delivery costs such as faculty costs, classroom arrangement costs etc.

Thus, the theme “*ROI Methodology*” was incorporated.

Justification of Theme 3

TABLE 2.3: RELEVANT STUDIES JUSTIFYING RESEARCH THEME 3

Themes	Relevant Studies Justifying Identified Research Themes
Measuring Methods of ROI	Booth, Alison L. 1991; Mark A Huselid, 1995; D Kirkpatrick, 1996; Deniz Eseryel, 2002; Ibrahim Mohamed, 2004; Christopher F. Bober, Kenneth R. Bartlett, 2004; Jane Schueler, Jack J. Phillips and Patti P. Phillips, 2007; Raja Waqas, 2009 Kaminski, Karen, Lopes, Tobin, 2009; John Edmonds, 2010; Kent Barnett, John R. Mattox 2010; Iqbal, M.Z., Maharvi, M.W., Malik, S.A. and Khan 2011; A. Mohamed, A. Rasli, N.N. Abu Mansor 2012; K S Subramanian, Vinita Sinha, Priya D Gupta, 2012; Mohamed, A. Rasli, A. Mansor, N.N. Abu, 2012; Varghese, K X, Manoj, PK, 2013; Upadhyay & Bhola Nath, 2013; P. Shakila, 2014; ROI Institute Inc, 2015; Sherrie Artman et al., 2015; Martin G Tolsgaard et al., 2015; Armin Hopp, 2016 Gosim Martin Chukwu, 2016; Mary Mcdonagh, 2016; Cassandra C Jasson et al., 2017 Travis K Brewer; Jerry L Wircenski, 2017; Bukhari et al. 2017; Al-Mughairi, Aliya Mohammed 2018; Vincent Rubino, 2021; Yifan Gao, Vicente A Gonzalez, AK Wing Yiu, 2019

Identification of Underpinning Theory: Phillips theory on ROI of Training

During the literature review, the researcher has undergone many theories. The theories associated with rural electrification training in Indian DISCOMs are primarily economic development associated with rural electrification, off grid rural electrifications, distribution reforms, sustainable development, csr, and reform theory. the effectiveness of training covers various theories such as principles of training, determinants of training needs, constructive developmental theory, transfer of training, theory of human capital, adult learning theory, expectancy theory, goal-setting theory, behavioural learning

theory, microlearning theory, constructivist learning theory, learning curve theory, gamification learning theory, sensory theory, storytelling learning theory, social learning theory, CIRO model, Kirkpatrick's model, The organizational elements model, Phillip's ROI evaluation model, integrated model of training evaluation and effectiveness (IMTEE), Brinkerhoff's success case method, summative evaluation, formative evaluation, learning evaluation etc.

Keywords 3,4,5,6 focused on the underline theory of measuring methods of ROI. The theory associated with the effectiveness of any training primarily focuses on Kirkpatrick- 4 Level training evaluation model (1959), Daniel Stufflebeam -CIPP evaluation model (1960), Robert Stake – responsive evaluation model (1967), Warr, Bird and Rackham -the CIRO model (1970), Robert Brinkerhoff- the success case study method (1983), Kaufman – five-level evaluation (1994), Dr Jack Phillips- Added 5th Step, i.e., ROI to Kirkpatrick's 4 Level (1995) (Tripathy & Thakur, 2014).

In his theory on the ROI of training, Philips outlines how monetary or financial sums should be considered when calculating the cost and benefit of training in an organization. However, the most challenging part is measuring the cost and benefit of training as it differs from industry to industry (Bond et al., 2019; Schroeder-strong et al., 2022; A. Taylor, 2019). While many training costs are tangible and easier to quantify, others, such as faculty and training facility costs, like missed training opportunities and efficiency, are harder to measure. Similarly, the benefits of training are more difficult to quantify, especially the moderately tangible elements like skill proficiency, and nearly impossible to quantify when trying to measure the intangible elements like employee motivation, general psychological experience of safety and security etc

This study proposes to look into the effectiveness of rural electrification training; thus, the “Phillips theory on ROI of training” theory was identified.

Justification of Underpinning Theory:

TABLE 2.4: JUSTIFICATION OF UNDERPINNING THEORY

Themes	Relevant Studies Justifying Identified Research Themes
Phillips theory on ROI of Training	D Kirkpatrick, 1996; Deniz Eseryel, 2002; Jack J. Phillips and Patti P. Phillips, 2007; Raja Waqas, 2009 Kaminski, Karen, Lopes, Tobin, 2009; John Edmonds, 2010; Kent Barnett, John R. Mattox 2010; Iqbal, M.Z., Maharvi, M.W., Malik, S.A. and Khan 2011; A. Mohamed, A. Rasli, N.N. Abu Mansor 2012; K S Subramanian, Vinita Sinha, Priya D Gupta, 2012; Werner, Jon M. DeSimone, Randy L. 2012, ; Mohamed et al., 2012; Kuldeep Sing 2013; Varghese, K X, Manoj, PK, 2013; P. Shakila, 2014; ROI Institute Inc, 2015; Sherrie Artman et al., 2015; Martin G Tolsgaard et al., 2015; Armin Hopp, 2016 Gosim Martin Chukwu, 2016; Mary Mcdonagh, 2016; Cassandra C Jasson et al., 2017 Travis K Brewer; Jerry L Wircenski, 2017; Bukhari et al. 2017; Mughairi &, Mohammed 2018; Manna, Atanu Biswas, Debasish Vincent Rubino, 2018; Yifan Gao, Vicente A Gonzalez, AK Wing Yiu, 2019, Kowara et al., 2020 Pandey et al., 2022

2.3 CRITICAL REVIEW

Critical review of literature presents a critique, or an unbiased, critical analysis, of existing research on a particular topic. The critical review methods identify the literature, and evaluating literature reviews are outlined, depending on the experiences and best practices in conducting and reporting systematic reviews (Torraco, 2016). Researchers can explain the quality of this evidence base, summarise and compare the review's conclusions, and evaluate the strength of these conclusions by identifying and analyzing all published reviews (Okoli, 2015; Templier & Paré, 2015).

The critical review reveals that the researcher has carefully read and assessed the material (Grant & Booth, 2009). It goes beyond simple description and takes into account the depth of conceptual originality. The critical review resolves a number of problems, including the extent of the review's search, an explanation of the study selection and inclusion criteria, comparability of included studies, assessment of publication bias, assessment of heterogeneity, and implications for practice and research (V. Smith et al., 2011).

In a theme-wise critical literature review, the researcher tries to select the articles which can be significant to the present study (Ryan & Bernard, 2016; Grant & Booth, 2009). Theme-wise, detailed structured literature is as below:

Critical Review Theme 1- Rural Electrification Training in Indian DISCOMs

The Indian power sector has many challenges in delivering reliable, affordable, sustainable power. DISCOMs, the licenced retailers, are at the end of the electricity value chain and play the most important role in rural electrification (Paul & Tyagi, 2022; Shakti Sustainable Energy Foundation, 2018). DISCOMs are responsible for connecting rural consumers and providing reliable, affordable, and sustainable power. In the absence of a cost-reflective tariff, DISCOMs reluctantly serve rural consumers as welfare rather than commercial (Agarwal et al., 2019; Carter-Brown & Gaunt, 2019; Nhalur, 2018; Bhattacharyya, 2006;). Moreover, DISCOMs are affected by their poor financial condition, and most of the DISCOMs are loss-making with a myriad of problems like average cost of service (ACS), more than average revenue requirement (ARR), High AT&C Loss (more than 20 per cent). It is no surprise that DISCOMs lacked any commercial initiatives as retailers towards any sales maximisation by rural electrifications (Niti Ayog & CRISIL Infrastructure Advisory, 2019).

Govt of India has undertaken many rural electrification programmes since the 1950s as a welfare initiative toward overall rural development, correcting

regional inequalities (Paul & Tyagi, 2021). All the initiatives of central Govt Schemes are implemented through DISCOMs and thus depend on the skill and knowledge of DISCOM's workforce. Considering the same, the centrally funded schemes have also provided a budget for training DISCOMs toward the effective implementation of rural electrification schemes (DDUGJY, 2015; Nhalur, 2018; REC, 2005). Various studies have focused on a positive correlation between training and development of human capital with organisation value addition. Thus the need for this study based on rural electrification training in Indian DISCOMs theme is crucial as rural India needs 24x7 power for developing the country through rural development such as helping the farmers and educating the village children, reducing gender discriminations, the safety of people, individual quality of life, improved health services, more considerable business opportunity etc (Banerjee et al., 2014; S. R. Khandker et al., 2009; S. R. Khandker, Samad, Ali, et al., 2014; World Bank, 2008). Therefore, rural electrification training has become essential to improve consumption towards holistic rural development and augmentation of related infrastructure to make reliable, affordable and sustainable power (Paul & Tyagi, 2022). Moreover, using renewable energies or hybrid systems enhances a more cost-effective and sustainable way of rural electrification, requiring know-how to run and maintain the system (Basu & Sahoo, 2016; Singal et al., 2007).

The outcome of the discussion on reviewed literature on rural electrification training in Indian DISCOMs focused on the need for rural electrification training in Indian DISCOMs. There was overly focus on rural electrification benefits & challenges in general and, the Issues and challenges of Indian DISCOMs, and very few studies on the training of DISCOMs. Therefore, a review of the first research "theme rural electrification training in Indian DISCOMs" indicates the following research gaps

1. The literature review on the training of employees in indian electricity distribution utilities (DISCOMs) needs more studies.

2. Although various studies regarding rural electrifications are available in the literature, studies on the training and development of DISCOMs in the area of rural electrification trainings are scanty.
3. There is a lack of scholarly attention on the lack of skilled workforce of DISCOMs in meeting challenges and solutions towards providing reliable, affordable and sustainable power to all.

Critical Review of Theme 2- Framework for Effectiveness of Training in DISCOMs

The need for training in electricity distribution utilities (DISCOMs) towards rural electrification is evident from the provision of training budgets in centrally funded rural electrifications schemes such as RGGVY, DDUGJY and even other distribution modernisation or reform policies (Paul & Tyagi, 2022; REC, 2005; Vishwakarma & Tyagi, 2016). However, a skill gap exists in DISCOMs despite the expenditure on training by various policies under MoP and GoI (Josey et al., 2018; Nhalur, 2018; Paul & Tyagi, 2021).

This has received peripheral focus in few studies, and there is a lack of empirical evidence on the effectiveness of this training effort and thus benefits of the training expenditure.

As most DISCOMs are loss-making, the investment for training is very minimal. Few of the DISCOMs do have any training policy which proposes of 2% salary expenditure, but in reality, due to the poor financial health of DISCOMs, the training in DISCOMs mainly depends on free and sponsored training through various organisations (such as REC Ltd, PFC Ltd, NPTI, PSSC (Power Sector Skill council), EESL etc.) under MoP, GoI. This study aims to conduct a literature review on the framework of training effectiveness in DISCOMs for rural electrification. It seeks to investigate the value and efficacy of training and development in DISCOMs, the weakest link in the power sector to provide rural electrification.

The above review on the second research theme, 'Framework for Effectiveness of Training in DISCOMs, ' highlights the following research gaps

1. Mostly, training effectiveness covers research areas such as a) training planning, training need, reasons necessitating training in organizations, b) Factors in the training programs, c) Assessment of the effectiveness of training programs, and d) Methodology of training and thus there is need of studies of training effectiveness in Indian DISCOMs towards rural electrification.
2. There is a dearth of studies focusing on the framework for the effectiveness of training in Indian DISCOMs.

Critical Review of Theme 3- Measuring Methods of ROI (Return of investment) on training

The effectiveness of training programmes on organisational outcomes was traditionally measured by Kirkpatrick's four levels (Kaufman & Keller, 1994). Many researchers, such as Goldstein and Ford (2002), Kirkpatrick (1998) etc., proposed measuring the effectiveness of a training programme through training evaluation. According to a more thorough explanation provided by Buckley and Caple (2007), evaluation aims to determine the whole value of training, taking into account the cost-benefit analysis and additional benefits for both the organisation and the trainee. Kirkpatrick's model was improved with the addition of Philip's fifth level (ROI) (Phillips, 1998). Before this, ROI was traditionally used in the economic and finance domain to evaluate an investment's performance or to compare the performances of several other investments. It is a measurement method comparing profits to invested capital in economic terms.

There is no shortage of literature on enhancing productivity and efficiency through training and development. Developing talent, skills, and knowledge incur various expenditures such as faculty cost, facilities and infrastructure cost, human resources cost etc. While every business investment is subjected to scrutiny by management on its financial outcome, benefit to the organisation, the rate of return on training investment is not consistently evaluated (Al-Mughairi, 2018; Bramley & Kitson, 1994). Various studies on measuring the benefit of training have given mixed results. Not all training benefits can be converted into financial outcomes, and focusing solely on financial outcomes risks overlooking

other challenging to quantify benefits (Jasson & Govender, 2017; Phillips & Phillips, 2016).

Although training can improve individual and organisational performance, the consequences vary greatly depending on the industry, the nature of the job and skill requirements. For example, the training of drivers and pilots is of high impact as saving one accident is more than the annual training cost (Mariscal et al., 2019; Elias et al., 2011). Thus, the benefit is not uniform across industries and even not the same across generation, transmission and distribution in the Indian power sector. Besides these, some researchers used subjective research methodologies and others methodologically incorrect data collection, thus leaving a void in the body of knowledge on this topic (Earl R Babbie; J Mouton, 2011; Nguyen Ngoc Thang, 2010). However, return on investment means different things to different people in different situations regarding training because the benefits of training can be applied to the learners, the company, or several other multi-faceted criteria (Bukhari et al., 2017). So, when it comes to ROI, the first and most challenging question is what to assess and how to measure it. The return on investment (ROI) model is developed within the organisation so that the success of a training programme or series of training programmes can be measured more precisely in monetary terms, allowing management to understand the direct impact on the business bottom line as a causal effect of the training imparted. This study aims to provide a system for analysing the cost and benefit of training in DISCOMs, which will help to prioritise the training programme and improve the less beneficial training programme. The framework will allow researchers to measure the shortcomings in the areas of investment and ensure investors about the worth of the project. It will provide empirical evidence on cost and benefit analysis and ensure the effectiveness of training.

DISCOMs' human resources are not adequately trained, and a skill gap in the new technologies and practices results in poor performance and reduced customer satisfaction (R. Tyagi & Vishwakarma, 2017; Power Today, 2016). Whether run in-house or conducted externally, most training programs are

attended only by those who can be spared from such training programs (Daruka, 2015). There is the overall focus of the literature on the measurement of training ROI, but there is no empirical study focusing on measuring the ROI of Rural Electrification training; this study focuses on measuring the same in Indian DISCOMs.

The above discussion highlights under mentioned research gaps on the third research theme, 'Measuring Methods of ROI':

1. The existing literature on measuring methods of ROI for training is not available for Indian DISCOMs, and thus, there is a need for studies on measuring methods of ROI for Training in Indian DISCOMs for the effectiveness of training.

Critical Review of Underpinning Theory: Phillips theory on ROI of Training

Training is an investment in human capital towards enhancing knowledge, skill and capabilities of human capital to fulfil training strategy, which in turn is related to business strategy to deliver organisational results (Hossain & Roy, 2016). The effectiveness of the training is of paramount importance as it helps to focus the relatively better performing training programmes, prioritise investment, improve training programmes etc.

The return of investment in training programme is generally unknown and not related to the business results. The effort and money spent into creating human capital is sometimes regarded as an expense rather than an investment due to a lack of evaluation on the return. Phillips' introduced ROI model adding the return on investment to yield to the top of Kirkpatrick 4 level model aiming to proposing a way to measure return of the investment. ROI intends decision-makers to compare value of training investment with other training and even other potential investment opportunities (Bailey, 2005; McDonagh, 2016). ROI is the best tool to measure return on investment in any training. However, measuring the same is tricky due to various reasons such as unavailability of framework to capture all tangible and intangible data, data unavailability,

measurements vary across the industry etc (Bond et al., 2019; Schroeder-strong et al., 2022; A. Taylor, 2019).

Although ROI can be expressed in several ways, it is usually expressed as a percentage or cost/benefit ratio (Phillips & Phillips, 2016).

$$\text{ROI of Training is defined as ROI (\%)} = \frac{\text{Benefit of training} - \text{Cost of training}}{\text{Cost of training}}$$

Where cost of training = tangible costs + intangible costs and
benefits of training = tangible benefits + intangible benefits (Jasson & Govender, 2017; Lynch et al., 2006)

As stated by K. Anderson & G. Woodill (2004), there is something beyond ROI analysis based on mere financial data, such as intangible programme benefits like corporate commitment, teamwork, less complaints, and conflicts, fewer accidents etc (Mariscal et al., 2019; Elias et al., 2011). However, these intangible benefits are difficult to quantify (McDonagh, 2016; Mohamed et al., 2012). Thus, though ROI is the best tool to know how the training investment contributes to building institutional capabilities towards higher revenue, measuring the same is tricky with data availability, and measurements vary across the industry (Barnett & Mattox, 2010). Moreover, it is much more difficult for DISCOMs with commercial and profitability oversight and less availability of hard and soft data (Subramanian et al., 2012). Thus, there is a dearth of scholarly literature on the theory of ROI methodology in measuring training effectiveness in any DISCOMs. Thus, the theoretical gap in ROI of training in Indian DISCOMs.

2.3.1 THEMATIC RESEARCH GAP

Theme-wise research gaps as identified are listed below:

Research Gaps under theme 1: Rural Electrification Training in Indian DISCOMs

1. The literature review on the training of employees in Indian utilities needs more studies.
2. Although various studies regarding rural electrifications are available in the literature, studies on the training and development of DISCOMs in rural electrification training are scanty.
3. There is a lack of scholarly attention on the lack of skilled workforce of DISCOMs in meeting challenges and solutions towards providing reliable, affordable and sustainable power to all.

Research Gaps under theme 2: Framework for Effectiveness of Training in DISCOMs

1. Mostly, training effectiveness covers research areas such as:
 - a) training planning, training need, reasons necessitating training in organizations
 - b) Factors in the training programs
 - c) Assessment of the effectiveness of training programs and
 - d) Methodology of training
2. There is a need for training effectiveness in Indian DISCOMs towards rural electrification.
3. There is a dearth of studies focusing on training effectiveness in Indian DISCOMs.

Research Gap under theme 3: Measurement Methods of ROI for training

1. the existing literature on measuring methods of ROI for training is not available for Indian DISCOMs, and thus, there is a need for studies on measuring methods of ROI for Training in Indian DISCOMs for the effectiveness of training.

2.3.2 THEORETICAL RESEARCH GAP

The theoretical gap from theoretical premise of Phillips theory on ROI of Training is summarised as “ There is a dearth of scholarly literature on Phillips theory on ROI of Training in measuring training effectiveness in any DISCOMs”.

2.4 CONSOLIDATION OF RESEARCH GAPS

Miles (2017) proposed a new model for research gaps built on the two previous models by Müller-Bloch and Kranz (2014) and Robinson et al. (2011) that consist of seven core research gaps (a) Evidence Gap; (b) Knowledge Gap; (c) Practical-Knowledge Conflict Gap; (d) Methodological Gap; (e) Empirical Gap; (f) Theoretical Gap and (g) Population Gap

The thematic and theoretical research gaps are summarized as mentioned in Figure 2.3

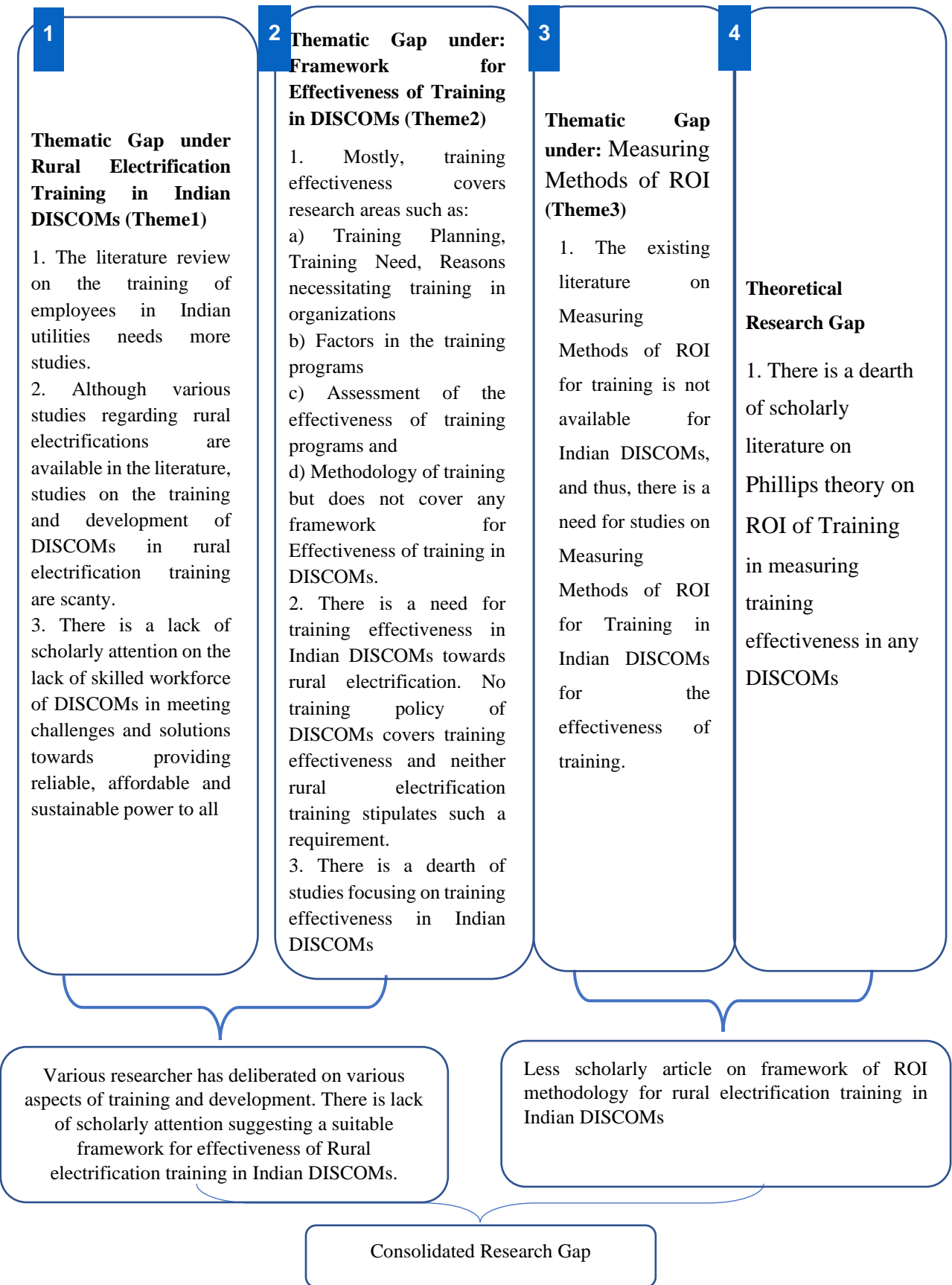


FIGURE 2.3: REFINING RESEARCH GAP

RESEARCH GAP

After identifying the thematic and theoretical premises gaps, the gaps were synthesised towards a consolidated research gap (Webster & Watson, 2002; Wolfswinkel et al., 2013).

Finally, the research gap is identified and presented using Margaret R Roller's funnel approach (2016).

A detailed literature review suggests that a comprehensive study could not be found on the framework for ROI for rural electrification training of DISCOMs.

The literature review process toward consolidated research gap is summarized as follows

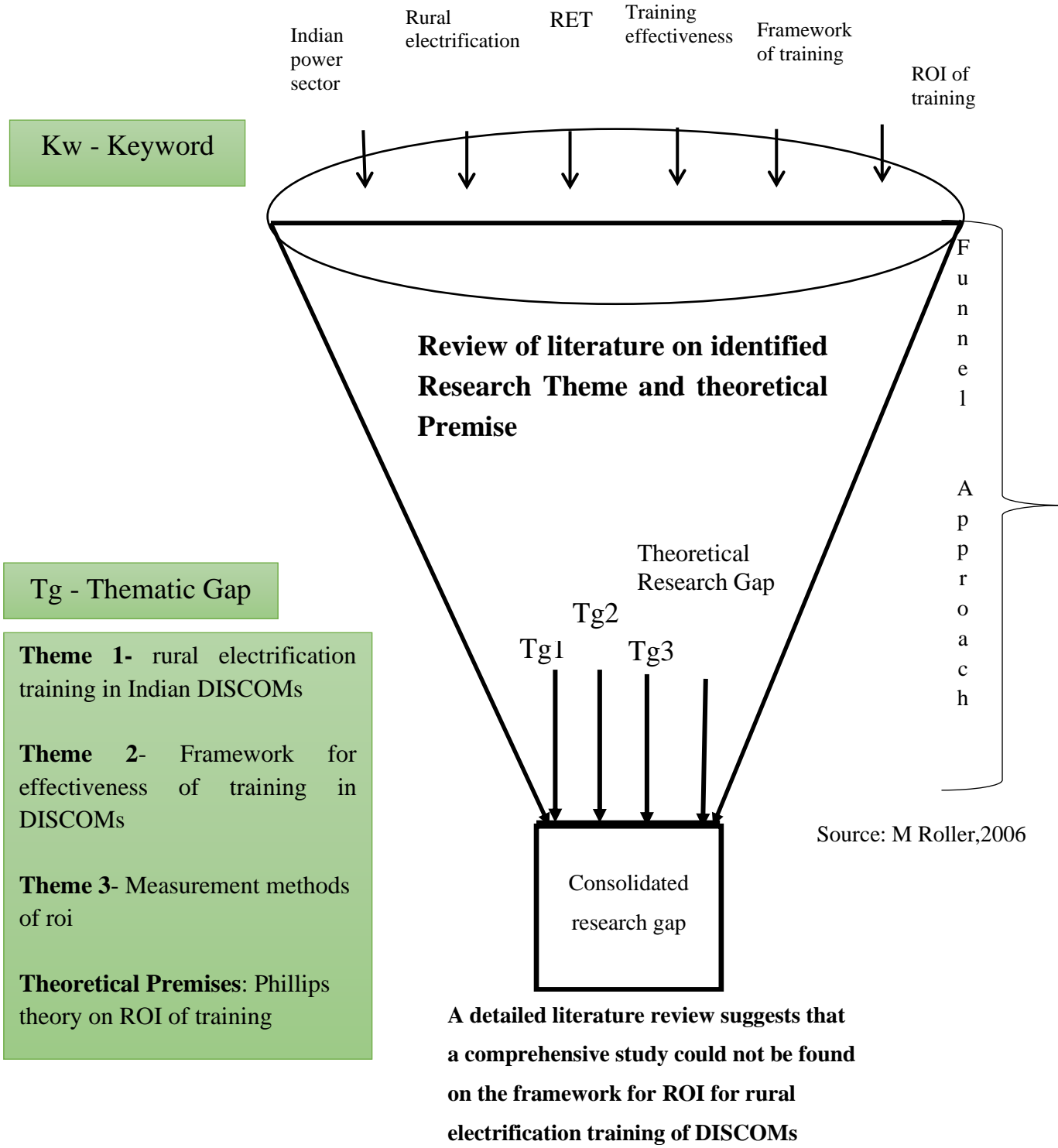


FIGURE 2.4: FUNNEL APPROACH FOR CONSOLIDATION OF RESEARCH GAP

The identified research gap helped the researcher define the research problem and specific objectives of the research study. They are presented here.

2.5 RESEARCH PROBLEM

According to Hermon & Schwartz (2007), any problem statement in the social sciences should contain four components:

- Lead-in (background of study);
- Declaration of originality (e.g., mentioning a knowledge void, which the literature review would support);
- Indication of the central focus of the study
- explanation of study significance or the benefits derived from investigating the problem.

The research problem is stated as

What should be adopted by DISCOMs for measuring the effectiveness of RURAL electrification training in terms of ROI?

2.6 RESEARCH QUESTIONS

What should be the framework for ROI of rural electrification trainings of DISCOMs?

2.7 RESEARCH OBJECTIVES

To formulate the framework for ROI of rural electrification trainings of DISCOMs

2.9 SUMMARY

- The researcher Identified six keywords from the problem statement (Business Problem). The six keywords are Keyword 1: Indian power sector, Keyword 2: Rural electrification, Keyword 3: Rural electrification training, Keyword 4: Training effectiveness, Keyword 5: Framework of training, and Keyword 6: ROI of training.
- The researcher searched the Web of Science and Scopus databases with the keywords. Furthermore, the researcher had also searched Websites and reports of various Government bodies and organizations like IEA, World Bank etc. A total of 18,060 publications were identified in the first search, which was screened further in the light of inclusion and exclusion criteria to reach 343. The researcher reviewed these 343 articles to identify themes and underpinning theory.
- The researcher identified the following three research themes-a) Theme 1- Rural Electrification Training in Indian DISCOMs, b) Theme 2- Framework for Effectiveness of Training in DISCOMs and c) Theme 3- Measuring method of return on investment (ROI).
- The underpinning theory is the ROI of Training.
- The researcher on critical review identified the following research gaps on theme 1: a) The literature review on the training of employees in Indian utilities needs more studies b) Although various studies regarding rural electrifications are available in the literature, studies on the training and development of DISCOMs in rural electrification training are scanty. c) There is a lack of scholarly attention on the lack of skilled workforce of DISCOMs in meeting challenges and solutions towards providing reliable, affordable and sustainable power to all
- The researcher on critical review identified the following research gaps on theme 2: a) Mostly, training effectiveness covers research areas such as i) training planning, training need, reasons necessitating training in organizations ii) Factors in the training programs iii) Assessment of the

effectiveness of training programs and iv) Methodology of training but does not cover any framework for Effectiveness of training in DISCOMs. b) There is a need for training effectiveness in Indian DISCOMs towards rural electrification. No training policy of DISCOMs covers training effectiveness; neither rural electrification training stipulates such a requirement. c) There is a dearth of studies focusing on training effectiveness in Indian DISCOMs

- The researcher on critical review identified the following research gaps on theme 3: The existing literature on Measuring Methods of ROI for training is not available for Indian DISCOMs, and thus, there is a need for studies on Measuring Methods of ROI for Training in Indian DISCOMs for the effectiveness of training.
- The researcher on critical review identified the following research gaps on underpinning theory is: There is a dearth of scholarly literature on the theory of ROI of Training in any DISCOMs
- The researcher used the funnel approach (Roller, 2016) to consolidate the gap between the thematic and theoretical premises.
- The study's research gap is “A detailed review of the literature suggests that a comprehensive study could not be found on the framework for ROI for rural electrification training of DISCOMs.”
- The Research Problem for the study is “What should be adopted by DISCOMs for measuring the effectiveness of rural electrification training in terms of ROI?”
- The critical analysis of the research gap and the present study's purpose frame the following Research question “What should be the framework for ROI of rural electrification trainings of DISCOMs?”
- The research objective is to formulate the framework for the ROI of rural electrification trainings of DISCOMs.

CHAPTER 3

REVIEW AND FRAMEWORK METHODOLOGY

This chapter details the study undertaken to develop a framework for ROI of rural electrification trainings of DISCOMs. In the previous chapter on literature review, literature searched through keywords was screened, retrieved, and analysed to narrow down further the literature required for this study to undergo critical review through thematic analysis. The research gap obtained through consolidating thematic and theoretical research gaps was used to identify the research problem and objective. This chapter elaborates on the research method, i.e., review methodology and framework analysis, to answer the research question. The existing 343 literature was narrowed down to 43 documents through the review process and further quality validation through MMAT Tool. The conceptual lens was made from this reviewed literature. The operating definition for the present study is also included in this chapter.

3.1 INTRODUCTION

Research is a process of systematic inquiry that entails data collection, documentation of critical information, and analysis and interpretation of that data/information, according to suitable methodologies set by specific professional fields and academic disciplines (Collis & Hussey, 2009; Sekaran & Bougie, 2003).

Albert Einstein once said, “everything that can be counted does not necessarily count; everything that counts cannot necessarily be counted”, and qualitative research focuses on the experience that we cannot count (Toye, 2015). Qualitative research is a strategy for systematically collecting, organising, and interpreting phenomena that are difficult to measure quantitatively (Maxwell, 2012).

With the epistemological and ontological positions of the researcher, the research paradigms are determined. Qualitative and quantitative research is often presented as two fundamentally different paradigms through which we study the social world (Mahesh, 2020).

In order to find the answer to research questions, considering epistemological and ontological considerations, the researcher had designed the research as

- Type of Research
 - **Qualitative Research**
- Research Method
 - **Review and framework methodology**

According to Saunders et al.(2007), longitudinal studies have an untapped capacity for studying change and growth (Saunders et al., 2007). As long as the research procedure has no impact on the variables being researched, Adams and Schvaneveldt (1985) thought the researcher could exert control over them. Due to the time constraints, this study chose to be cross-sectional.

Over the last two decades, notable growth has been observed in qualitative research methods in applied policy research (Liberati et al., 2009; Ritchie et al., 2003). Literature review is used to develop the conceptual model by mapping the development of the research area over time (Torraco, 2016). Rather than limiting the literature review to relating existing knowledge, the literature review increasingly focuses on collecting creative data and analysing the content. Thus literature review is increasingly being used as a research methodology (Contandriopoulos et al., 2010; Greenhalgh et al., 2005; Liberati et al., 2009; Mays et al., 2005; Snyder, 2019). In order to ensure the quality and trustworthiness of findings, the review follows a transparent methodology consisting of the process of review design, method of collecting literature stating how literature is identified, analysed, synthesised and reported (Barnett-Page & Thomas, 2009; Contandriopoulos et al., 2010; Gough et al., 2012). The researcher followed the review

methodology for the conceptualisation of the theoretical framework, which involved screening literature with inclusion and exclusion criteria, the review process of literature with research questions, and quality assessment through the MMAT validation tool (Greene et al., 2016; Q.N. Hong & Pluye, 2018; Leshem & Trafford, 2007; Maxwell, 2011; Scribber, 2021).

While the conceptual framework involves the researcher's view of the world and approach to answering the research problem, the empirical framework involves answering the research problem through experiment, experience and direct or indirect observation (Maxwell, 2011) . Therefore, this study aims to develop an empirical framework for ROI of rural electrification trainings of DISCOMs and uses Framework Analysis for empirical analysis.

Framework Analysis is considered the most appropriate Qualitative Research Method for applied policy research (Srivastava et al., 2009). The 'Framework Methodology' for data analysis was obtained from Ritchie and Spencer in 1994, expanded and adapted by Smith and Firth in 2011 (J. Smith & Firth, 2011). The framework analysis is the systematic approach of qualitative analysis of data that can be done both during and following data collection (Ritchie et al., 2003). Framework Analysis is a subset of the thematic analysis popularly known as qualitative content analysis (Onwuegbuzie et al., 2012; Ram et al., 2008). The analysis identifies commonalities and differences to establish the relationship between various data sets. The framework analysis provides a clear track to move data from original data sources to transcripts to categories and themes (Furber, 2010). The analysis draws descriptive and explanatory accounts around a number of themes. With help of framework methodology, the researcher systematically reduces and summarises the data through the matrix-like structure of rows (cases), columns (codes) and cells (summarised data) (Gale et al., 2013)

3.2 REVIEW METHODOLOGY

Joppe (2000) explained that research is valid if the instrument fulfils the research objective, and thus, research methodology and quality of research are of immense importance (Bashir et al., 2008). However, the existing body of knowledge is growing tremendously, and researchers face an increasing challenge in integrating the existing knowledge into his/ her research study. Furthermore, with an increasing dimension of complexity in research with growing more interdisciplinary study, the literature review has expanded its use beyond mere synthesis towards finding knowledge gaps or justifying research by adding to the body of knowledge or validating research methodology.

Recently researchers have used *literature review as a research methodology*, as the main goal is to synthesise the literature in a field. (Snyder, 2019). Rather than using for existing knowledge in a particular subject, it as the basis for a researcher's study and a reliable starting point (Mulrow, 1987). Thus, literature review, besides providing a background of knowledge for researchers to build on their research, is being used as a research methodology. This review methodology in literature is increasing as a methodology for qualitative research in policy or framework development (Gale et al., 2013; Quan Nha Hong et al., 2019; Leech & Onwuegbuzie, 2011; Snyder, 2019). The term "review article" refers to a journal-length publication with the overriding goal of synthesising the literature in an area without gathering or evaluating any primary data (Green, Johnson, & Adams, 2006). Empirical studies' high-quality reviews become commonly cited pieces of work that researchers seek as a first clear description of the literature (Cooper, 1988; Rowe, 2014). Their popularity stems from the fact that reading a review provides an overview, if not in-depth knowledge, of the topic at hand and referrals to the most valuable primary sources (Cronin et al., 2008). Different literature review approaches are followed depending on the research goal, such as systematic, semisystematic or integrative (Snyder, 2019). Leech and Onwuegbuzie's (2007) conceptualised two significant types of goals during

the literature review process: representation and legitimation. Representation helps better synthesise data by extracting adequate meaning from the information at hand, whereas Legitimation refers to the credibility, trustworthiness, dependability, confirmability, and transferability of syntheses made (Denzin & Lincoln, 2011; Onwuegbuzie & Frels, 2014).

Review Methodology serves as a basis for knowledge development, creates guidelines for policy and practice, identifies the recent research in ROI and training and evaluates the quality of review articles. Mixed-Method Appraisal Tool (MMAT) is used. MMAT is a reliable content evaluation tool developed in 2009 (Pluye et al., 2009) and revised in 2012 (Pace et al., 2012), which helps in critically appraising methodological quality criteria for different designs such as qualitative or mixed by a single tool. (Quan Nha Hong et al., 2018). Depending upon the researcher's goal, various review methodologies such as systematic, semi systematic or integrative approaches will be followed.

The literature review was conducted in chapter 2 to derive the research gap through a critical review of 343 documents using thematic analysis. The same 343 documents were further reviewed through the review process as mentioned in Figure 3.1 and Figure 3.2

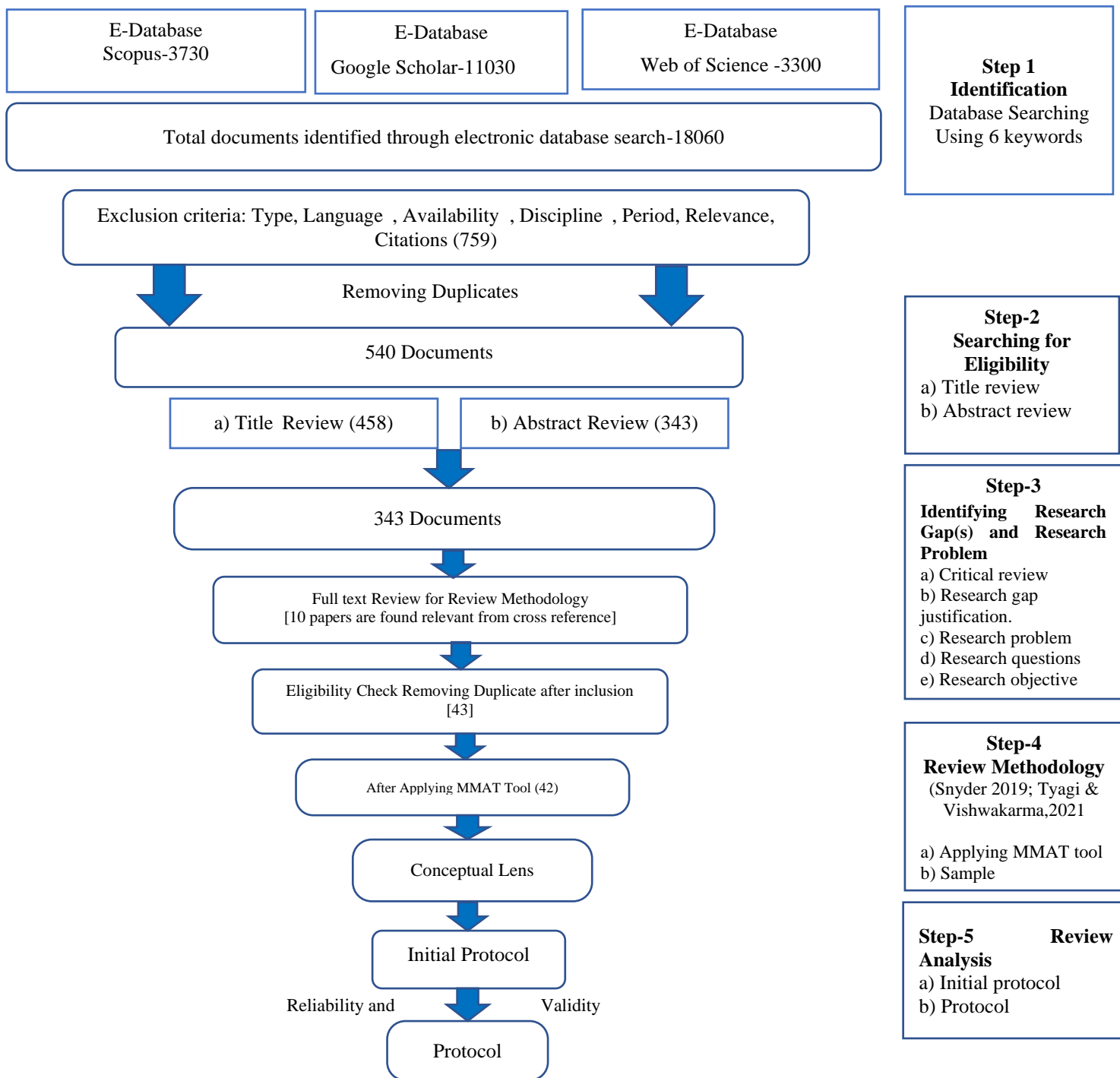


FIGURE 3.1: INTERVIEW PROTOCOL FLOW CHART

REVIEW SAMPLE

The literature review focused on 7030 documents obtained through keyword search. After undergoing exclusion inclusion criteria as detailed in chapter 2.2, the documents were narrowed down to 343 through screening, retrieval, and in-depth analysis. These documents were critically reviewed with thematic analysis for the thematic gap and further consolidation with theoretical and thematic gap, the research gap was obtained, which led to the research problem and objectives.

Thus, a review process was needed to select the database (Onwuegbuzie & Frels, 2016; Snyder, 2019; Wanden-Berghe & Sanz-Valero, 2012). Thus, the database selected for critical was further cross-checked and refined based on various terms to narrow down the required literature.

REVIEW PROCESS

Step 1: Design	Step 2: Conduct
a) Is there a need to measure the Return of investment in training? Will it increase the effectiveness of rural electrification training?	a) The literature review lays the basic foundation of the study; 343 pieces of literature were reviewed to conduct thorough research for questions articulated in Step 1: design.
b) Is it possible to measure the cost of training (tangible and intangible), the benefit of training (tangible and intangible), and the measurement time to capture the same?	b) The literature was sorted into 42 publications. The quality was ensured through MMAT Tool, and finally, 42 documents were selected.
c) How to isolate the effect of the factors affecting training effectiveness for measuring ROI	c) A detailed conceptual lens was designed based on Step 1: design to formulate answers and derive

<p>and ways to isolate training effects.</p> <p>d) To define the benefits ROI-based training framework brings for rural electrification in DISCOMs and acknowledge short, medium- and long-term benefits of training towards a decision of investment towards team member training, if applicable.</p>	<p>solutions which led to the development of the protocol</p>
	<p>Step 3: Analysis</p> <p>a) The review has helped to analyse the documents through the qualitative approach of data management through coding and categorization</p> <p>b) The literature was further synthesized for code category and concept.</p> <p>c) Data analysis tools were applied to form charts and tables to depict the outcomes.</p>
	<p>Step 4: Forming and writing the review</p> <p>a) Interpretation and discussion were made to review the purpose.</p> <p>b) Policy and implication of study were a final review of the research.</p>

FIGURE 3.2:REVIEW PROCESS

After screening, we got 42 documents, which were qualitative, quantitative, and mixed-method. Under the Qualitative method, there were 26 documents; under the quantitative method, there were 13; and under the mixed, there were three documents. The summary of each piece of literature is encapsulated in the table below.

TABLE 3.1: LITERATURE PROFILE UNDER REVIEW

Sl. No	Title of the article	Author	Year	Study
1	Money, Energy, and Welfare: The State and the Household in India's Rural Electrification Policy	SARMILA BOSE. Delhi: Oxford University Press, 1993.	1993	Rural electrification training in Indian DISCOMs
2	Rural electrification and efforts to create enterprises for the effective use of power	Badri Prasad Bastakoti	2003	Rural electrification training in Indian DISCOMs
3	The Utilization of Training Program Evaluation in Corporate Universities	Christopher F. Bober, Kenneth R. Bartlett	2004	Cousins and leithwood framework
4	The electricity-livelihood nexus: some highlights from the Andhikhola Hydroelectric and Rural Electrification Centre (AHREC)	Bastakoti, Badri Prasad	2006	Rural electrification training in Indian DISCOMs
5	Power Sector Reforms: A Study on its Strategic Implications and Impacts on selected Companies in Gujarat	Mr Rajiv Kurulkar	2008	Power growth
6	Rural electrification: Accelerating impacts with complementary services	Peters, Jörg Jorg	2009	Effectiveness of training
7	Construction safety training via e-Learning: Learning effectiveness and user satisfaction	Ho, Chun-Ling Dzeng, Ren-Jye	2010	Effectiveness of training
8	The Effects of Rural Electrification on Employment: New Evidence from South Africa	Dinkelman, Taryn	2011	Rural electrification training in Indian DISCOMs

Sl. No	Title of the article	Author	Year	Study
9	Business Impact and ROI: A Proposed Approach to Learning and Development Investment	Mohamed, A.Rasli, A.Mansor, N.N. Abu	2012	ROI in training
10	Evaluating Entrepreneurship Education Programmes in Developing Countries: Lessons from Experience	Gerald Braun	2012	Effectiveness of training
11	Assessment Effectiveness on the Job Training in Higher Education (Case Study: Takestan University)	Mollahoseini, Ali Farjad, Shahrooz	2012	Kirkpatrick model
12	Study on Evaluation of Skills Training Effectiveness in Electric Power Corporation. Applied Mechanics and Materials	Zhang, Wen Yu ; Chen, Yan	2013	Effectiveness of training
13	Effects of Training on Employee Performance.	Aidah Nassazi	2013	Effectiveness of Training
14	Study of HRD Practices in Selected PSUs of Oil and Gas Sector- Special Reference to Non- Managerial Employees Training and Development	Upadhyay, Bhol Nath	2013	Effectiveness of Training
15	Surge in Solar-Powered Homes	Khandker rt al.	2014	SHS supply
16	Study on Evaluation of Skills Training Effectiveness in Electric Power Corporation	Wenyu Zhang Yan Chen	2014	Effectiveness of training
17	Rural electrification implementation strategies through microgrid approach in South African context	Z. Xu, M. Nthontho, S. Chowdhury	2014	Cost optimisation strategy
18	Rural Electrification and Household Labor Supply: Evidence from Nigeria	Claire Salmon And Jeremy Tanguy	2015	Rural electrification, economic policy

Sl. No	Title of the article	Author	Year	Study
19	Measuring effectiveness of manager training in a government service delivery agency based on training appraisals	Artman, Sherrie Kerr, Bernard J. Jones, Jerry Meckstroth, David	2015	Effectiveness of training
20	Electricity Sector Regulation and Sustainable Development Outcomes: an Analysis of Regulatory Impact in 12 Indian States for 2001-2010	Gopal Krishna Sarangi	2015	Power growth
21	Learning between projects: More than sending messages in bottles	Hartmann, Andreas Doree, Andre	2015	Effectiveness of training
22	India Energy Outlook	International Energy Agency Report (IEA)	2015	Rural electrification training in Indian DISCOMs
23	Trainer attributes as drivers of training effectiveness	Chukwu, Gosim Martin	2016	Effectiveness of training
24	A Case Study on Exploring the Relevance of Evaluation Characteristics in Designing an Evaluation Approach on Behaviour Level on Training Effectiveness	Soraya Mohammad	2016	Effectiveness of training
25	Case study evaluating the impact of QFA Training on Organisational Performance in a Credit Union using the Phillips ROI Model	Mcdonagh, Mary	2016	Effectiveness of training
26	Evaluation of the Effectiveness of Global Organization's Internal Training from Customer Point of View	Maiju Myllynen	2016	Kirkpatrick model

Sl. No	Title of the article	Author	Year	Study
27	Corporate social responsibility and dimensions of performance: An application to U.S. electric utilities	Amer Ait Sidhoum & Teresa Serra	2017	CSR
28	A framework for determining the ROI of simulation-based training in health care	Bukhari, Hatim, Goldiez Andreatta, Pamela,	2017	ROI in training
29	Factors Influencing Training Effectiveness: Evidence from Public Sector in Bahrain	Saeed et al.	2017	Kirkpatrick model
30	A proposed quantitative methodology for the evaluation of the effectiveness of Human Element, Leadership and Management (HELM) training in the UK	F. Saeed ¹ & A. Wall & C. Roberts & R. Riahi & A. Bury	2017	Human element, leadership and management (HELM)
31	Workplace Competence Assessment and Development of Frontline Managers at Indian Power Companies	Ruchi Tyagi and Suresh Vishwakarma	2017	Rural electrification training in Indian DISCOMs
32	Training transfer intention and training effectiveness	Al-Swidi, Abdullah Al Yahya, Mohammed	2017	TPB -theory of planned behaviour
33	The evaluation of training and development of employees: The case of a national oil and gas industry	Al-Mughairi, Aliya Mohammed	2018	Kirkpatrick Model
34	A novel renewable energy selection model for United Nations' sustainable development goals	Büyüközkan, Gülçin Karabulut, Yağmur Mukul, Esin	2018	Sustainable contribution of entrepreneurship

Sl. No	Title of the article	Author	Year	Study
35	A Comparative Analysis of Trainees and Trainers Perceptions Regarding Training Programmes in Indian Banking Sector. Journal of Strategic Human Resource Management	Athar Mahmood Ritu Narang	2018	Effectiveness of training
36	Towards the achievement of SDG 7 in sub-Saharan Africa: Creating synergies between Power Africa, Sustainable Energy for All and climate finance in-order to achieve universal energy access before 2030	Chirambo, Dumisani	2018	Rural electrification training in Indian DISCOMs
37	Clean cooking and the SDGs: Integrated analytical approaches to guide energy interventions for health and environment goals	Rosenthal et al.	2018	Rural electrification training in Indian DISCOMs
38	Comparative Study of Hrd Policies and Job Satisfaction of Employees of Public and Private Sector Banks	Ganguly, Prof Bijoya	2018	Effectiveness of training
39	Training, human capital, and gender gaps in entrepreneurial performance	Brixiová, Zuzana	2019	Effectiveness of training
40	Agrivoltaics provide mutual benefits across the food–energy–water nexus in drylands	Barron-Gafford et al.	2019	Rural electrification training in Indian DISCOMs
41	The sustainability impact of new ventures Measuring and managing entrepreneurial contributions to sustainable development	Horne, Jannic	2019	Sustainable contribution of entrepreneurship

Sl. No	Title of the article	Author	Year	Study
42	Exploring entrepreneurship related to the sustainable development goals - mapping new venture activities with semi-automated content analysis	Horne et al.	2020	Sustainable contribution of entrepreneurship

The Literature were further reviewed based on Qualitative, Quantitative and Mixed Study

TABLE 3.2: LITERATURE PROFILE UNDER REVIEW-QUALITATIVE

Sl No	Author	Study	Year	Method
1	Christopher F. Bober, Kenneth R. Bartlett	Cousins and Leithwood framework	2004	Qualitative method
2	Bastakoti, Badri Prasad	Rural Electrification Training in Indian DISCOMs	2006	Qualitative method
3	Mr Rajiv Kurulkar	Power growth	2008	Qualitative method
4	Jörg Peters, Marek Harsdorff, Florian Ziegler	Effectiveness of Training	2009	Qualitative method
5	Dinkelman, Taryn	Rural Electrification Training in Indian DISCOMs	2011	Qualitative method
6	Mohamed, A.Rasli, A.Mansor, N.N. Abu	ROI in Training	2012	Qualitative method
7	Aidah Nassazi	Effectiveness of Training	2013	Qualitative method
8	Upadhyay, Bhol Nath	Effectiveness of Training	2013	Qualitative method

Sl No	Author	Study	Year	Method
9	Shahidur R. Khandker, Hussain A. Samad, Zubair K. M. Sadeque, Mohammed Asaduzzaman, Mohammad Yunus, and A. K. Enamul Haque	SHS supply	2014	Qualitative method
10	Wenyu Zhang, Yan Chen	Effectiveness of training	2014	Qualitative method
11	Artman, Sherrie, Kerr, Bernard J., Jones, Jerry, Meckstroth, David	Effectiveness of training	2015	Qualitative method
12	Gopal Krishna Sarangi	Power growth	2015	Qualitative method
13	Hartmann, Andreas, Doree, Andre	Effectiveness of training	2015	Qualitative method
14	International Energy Agency Report (IEA)	Rural Electrification Training in Indian DISCOMs	2015	Qualitative method
15	Chukwu, Gosim Martin	Effectiveness of training	2016	Qualitative method
16	Soraya Mohammad	Effectiveness of training	2016	Qualitative method
17	Bukhari, Hatim, Andreatta, Pamela, Goldiez, Brian	ROI in Training	2017	Qualitative method
18	Ehsan Saeed Idrees Yaqoot, Wan Shakizah Wan Mohd. Noor, Mohd Faizal Mohd Isa	Kirkpatrick model	2017	Qualitative method

Sl No	Author	Study	Year	Method
19	Athar Mahmood, Ritu Narang	Effectiveness of training	2018	Qualitative method
20	Büyüközkan, Gülçin, Karabulut, Yağmur, Mukul, Esin	Sustainable contribution of entrepreneurship	2018	Qualitative method
21	Chirambo, Dumisani	Rural Electrification Training in Indian DISCOMs	2018	Qualitative method
22	Ganguly, Prof Bijoya	Effectiveness of training	2018	Qualitative method
23	Rosenthal, Joshua, Quinn, Ashlinn, Grieshop, Andrew P., Pillarisetti, Ajay, Glass, Roger I.	Rural Electrification Training in Indian DISCOMs	2018	Qualitative method
24	Barron-Gafford, Greg A., Pavao-Zuckerman, Mitchell A., Minor, Rebecca L, Sutter, Leland F, Barnett-Moreno, Isaiah, Blackett, Daniel T., Thompson, Moses, Dimond, Kirk, Gerlak, Andrea K., Nabhan, Gary P, Macknick, Jordan E.	Rural Electrification Training in Indian DISCOMs	2019	Qualitative method
25	Horne, Jannic	Sustainable contribution of entrepreneurship	2019	Qualitative method
26	Horne, Jannic, Recker, Malte, Michelfelder, Ingo, Jay, Jason, Kratzer, Jan	Sustainable contribution of entrepreneurship	2020	Qualitative method
Total = 26				

TABLE 3.3: LITERATURE UNDER REVIEW -QUANTITATIVE

SI No	Author	Study	Year	Method
1	Sarmila Bose. Delhi: Oxford University Press, 1993	Rural Electrification Training in Indian DISCOMs	1993	Quantitative method
2	Badri Prasad Bastakoti	Rural Electrification Training in Indian DISCOMs	2003	Quantitative method
3	Ho, Chun-Ling, Dzeng, Ren-Jye	Effectiveness of training	2010	Quantitative method
4	Mollahoseini, Ali, Farjad, Shahrooz	Kirkpatrick model	2012	Quantitative method
5	Z. Xu, M. Nthontho, S. Chowdhury	Cost Optimisation Strategy	2014	Quantitative method
6	CLAIRE SALMON and JEREMY TANGUY	Rural Electrification, Economic Policy	2015	Quantitative method
7	Maiju Myllynen	Kirkpatrick model	2016	Quantitative method
8	Al-Swidi, Abdullah, Al Yahya, Mohammed	TPB -Theory of planned behaviour	2017	Quantitative method
9	Amer Ait Sidhoum & Teresa Serra	CSR	2017	Quantitative method
10	F. Saeed1 & A. Wall & C. Roberts & R. Riahi & A. Bury	Human Element, Leadership and Management (HELM)	2017	Quantitative method
11	Al-Mughairi, Aliya Mohammed	Kirkpatrick Model	2018	Quantitative method
12	Brixiová, Zuzana	Effectiveness of training	2019	Quantitative method
13	Ruchi Tyagi and Suresh Vishwakarma	Rural Electrification Training in Indian DISCOMs	2017	Quantitative research
Total = 13				

TABLE 3.4: LITERATURE UNDER REVIEW-MIXED

SI No	Author	Year	study	Method
1	Gerald Braun	2012	Effectiveness of training	Mixed-Method
2	Zhang, Wen Yu ; Chen, Yan	2013	Effectiveness of training	Mixed-Method
3	Mcdonagh, Mary	2016	Effectiveness of training	Mixed-Method
	Total = 3			

3.3 VALIDATION USING MMAT TOOL

The studies were divided based on descriptive, random, and non-random investigations based on the methodology used. To determine whether the MMAT could be employed, there were initially two questions (Hong et al., 2019). The final evaluation is done on “Yes (Y), No (N) and cannot tell (C), rating evaluated article quality on the scale of five (Quan et al., 2018); the calculation of the total score is not required

TABLE 3.5: MMAT QUALITY ASSESSMENT TABLE (QUALITATIVE METHODS)

SI No	Is the qualitative approach appropriate to answer the research question?	Are the qualitative data collection methods adequate to address the research question?	Are the findings adequately derived from the data?	Is the interpretation of results sufficiently substantiated by data?	Is there coherence between qualitative data sources, collection, analysis and interpretation ?
1	N	C	Y	Y	Y
2	Y	Y	Y	Y	Y
3	Y	Y	Y	C	Y
4	Y	Y	Y	Y	Y
5	Y	Y	Y	Y	Y
6	Y	Y	Y	Y	Y
7	Y	Y	Y	Y	Y
8	Y	Y	Y	Y	Y
9	C	C	Y	Y	Y
10	Y	Y	Y	Y	Y
11	Y	Y	Y	Y	Y
12	Y	Y	Y	Y	Y
13	Y	Y	Y	Y	Y
14	Y	Y	Y	Y	Y
15	Y	Y	Y	Y	Y
16	Y	Y	Y	Y	Y
17	N	C	Y	Y	Y

18	N	C	Y	Y	Y
19	Y	Y	Y	Y	Y
20	N	C	Y	Y	Y
21	Y	Y	Y	Y	Y
22	Y	Y	Y	Y	Y
23	Y	Y	Y	Y	Y
24	Y	Y	Y	Y	Y
25	N	C	Y	Y	Y
26	N	C	Y	Y	Y

TABLE 3.6: MMAT QUALITY ASSESSMENT TABLE (QUANTITATIVE METHODS)

SI No	Is the sampling strategy relevant to address the research question?	Is the sample representative of the target population?	Are the measurements appropriate?	Is the risk of nonresponse bias low?	Is the statistical analysis appropriate to answer the research question?
1	Y	Y	Y	Y	Y
2	Y	Y	Y	Y	Y
3	Y	Y	Y	Y	Y
4	Y	Y	Y	Y	C
5	Y	Y	Y	Y	N
6	Y	Y	Y	Y	Y
7	Y	Y	Y	Y	N
8	Y	Y	Y	Y	N
9	Y	Y	Y	Y	C
10	Y	Y	Y	Y	N
11	Y	Y	Y	Y	C
12	Y	Y	Y	Y	Y
13	Y	Y	Y	Y	Y

TABLE 3.7: MMAT QUALITY ASSESSMENT TABLE (MIXED METHODS)

SI No	Is there an adequate rationale for using a mixed-methods design to address the research question?	Are the different components of the study effectively integrated to answer the research question?	Are the outputs of the integration of qualitative and quantitative components adequately interpreted?	Are divergences and inconsistencies between quantitative and qualitative results adequately addressed?	Do the different components of the study adhere to the quality criteria of each tradition of the methods involved?
1	Y	Y	Y	Y	Y
2	Y	Y	Y	Y	Y
3	N	C	Y	Y	Y

3.4 CONCEPTUAL LENS

3.4.1 CONCEPTUAL FRAMEWORK

As the philosopher Hilary Putnam (1987, 1990) claimed in 1987 and 1990 that there could not be, even in principle, such a thing as the one true objective account, a God's-eye view; instead, every view has some perspective that is shaped by the location (social and theoretical) and lens of the observer (Maxwell, 2012). A conceptual framework is the researcher's understanding of how best the research problem will be solved, the researcher's lens on the study's variables, and their relations. Thus, it is not a string of concepts but has the whole epistemological and ontological research paradigms embedded with an understanding of existing literature (Strauss, 1987). The conceptual framework gives a logical shape to related concepts with a visual display or picture of the research considerations within the theoretical framework (Evans et al., 2011; Leshem & Trafford, 2007).

The conceptual framework primarily considers what the **researcher proposes to review** and investigate. It identifies potential validity threats to your research conclusions and thus refines goals (Maxwell, 2005). The concept of the Conceptual Framework is rooted in Vygotsky's sociocultural theory (Rieber & Wollock, 1997). Vygotsky's (1986) theory of concept formation is the foundation stone that provides a powerful tool for developing a conceptual framework (Berger, 2005). Miles and Huberman (1984) define a conceptual framework as 'the current version of the researcher's map of the territory being investigated (Miles & Huberman, 1994), and conceptual maps popularly referred to as conceptual lenses are getting used for developing conceptual framework (Johnson et al., 2020; Novak et al., 1984). A conceptual lens may be a visual display of key thoughts grasped from existing literature (Strauss, 1987). The conceptual lens usually requires a great deal of revising to direct them to the area where they are most useful for the research (Miles & Huberman, 1994). Keeping this in mind, the conceptual lens has been brushed up twice to support the event of conceptual framework during this particular research. Glatt horn

suggested that the conceptual framework must come from naturalistic research due to data grounding which develops theory (Glaser & Strauss, 1967; Strauss & Corbin, 1990). However, Blackmore and Ison (1998, pp. 52, 55) argue that systems, "Venn diagrams," and "conceptual modelling" influence how data is interpreted and conceptualised.

Vygotsky (1934,1986) presented three main classifications of pre-conceptual thoughts

- i) 'formation of syncretic groups',
- ii) 'grouping according to complexes', and
- iii) 'creation of potential concepts.

In their research compass, Ringsted, Hodges, and Sherpbier emphasized that the conceptual and theoretical framework is the key to any direction for qualitative research. They described three essential parts to an effective conceptual framework: theories and/or concepts and principles relevant to the study; what is known and unknown from earlier work, observations, and examples; and the researcher's ideas, and suppositions regarding the research problem statement and question (Ringsted et al., 2011). In qualitative research, these unknowns are critical to achieving a well-developed conceptual framework and a rigorous study design (Johnson et al., 2020).

Ravitch and Carl, in 2016, have summarised the best practices to develop a conceptual framework that has all components contribute to decisions regarding research design, implementation, and applications of results to future thinking, study, and practice. A conceptual framework's primary components interact with and influence other elements in a dynamic and interactive process from the beginning to the end of a research project (Ravitch & Carl, 2021).

Further guidance on the framework was provided by Maxwell (Maxwell, 2005). However, later Huberman and Miles caution qualitative researchers about developing and using a framework as it may influence qualitative

design deductively by violating the principles of induction that define the qualitative research paradigm (Miles & Huberman, 1994).

The researcher had undergone a critical review of existing literature through thematic analysis to establish the research gap, followed by the research problem and objectives. Then, the existing literature was further reviewed and validated by the MMAT tool. Thus, the literature was narrowed down to 42 literature which was used to develop a conceptual framework. These are further refined based on expert opinions (Malalgoda et al., 2018; Snyder, 2019).

The selected literature was repeatedly studied to facilitate proper coding of thoughts and further categorisation, as suggested by Strauss and Corbin in 1998 (Corbin & Strauss, 2012). As an intrinsic part of the qualitative research method, where the researcher encounters multiple realities behind the data, the procedure followed by the researcher incorporates the best practices of the conceptual lens, which considers problem statements, research questions, and experience tacit theories (Sharon M. Ravitch & Nicole Mittenfelner Carl, 2020). The researcher had undergone repeated readings to capture the literature's affective, cognitive, and symbolic dimensions. Through these processes, researchers can reveal the assembled materials' affective, cognitive, and symbolic dimensions. With immersion in data and reflexivity of researcher line of data, identifying the most salient significations in the coding of data, categorizing, finding concepts, and analytical insights to present an overall data storyline (Maxwell, 2005; Miles & Huberman, 1994). The transcripts are processed for codes, from codes to categories and categories to concepts.

Transcript	Description	Preliminary Thoughts	Open Code	Initial Category
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Initial Category	Refined Category	Sub-themes	Themes	Concept
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The table of data coding is enclosed in the appendix

USE OF SOFTWARE- VOYANT TOOLS SOFTWARE

It is advised to use software for qualitative research to make it easier to create literature evaluations that highlight key ideas and themes and show how they relate to one another, providing a unique perspective on what is already known (Bandara et al., 2011; Wolfswinkel et al., 2013).

Like other qualitative research, respondents' answers are typically coded in framework analysis. Coding may vary from simple to very complex, even using sixteen steps (Hetenyi et al., 2019). The coding process reduces more extended meaning units to one word. Then, using quantitative statistical techniques, these single-word comes can be analysed as categorical data. However, there are statistical techniques that can be employed without any prior coding, as the latent Dirichlet allocation used in topic modelling (Jacobi et al., 2015; Toubia et al., 2018), mention one which can be used without any previous coding.

Sinclair, Stefan and Geoffrey Rockwell (2016) developed Voyant Tools, a free, open-source, web-based text analysis software with advanced and flexible text editing capabilities that is beneficial for qualitative research (A. Miller, 2018; Bihanic, 2015; Bradley, 2019; Welsh, 2014). It is commonly used as a quantitative text analysis tool in several peer-reviewed articles (Clouder & King, 2015; Steiner et al., 2014; Williams et al., 2015; Zahedzadeh, 2017). Uboldi & Caviglia (2015) stated that data visualisation in social sciences is important for more effective research (Bihanic, 2015).

Voyant Tools is more useful with large textual data sets where manual content analysis methods are highly time-consuming. However, out of the twenty-four different tools , the researcher has used the five tools as listed below , however for displaying data researcher used cirrus tools, correlation tools and collocates graph.

1) **Cirrus Tool**

It is a tool for creating word clouds in which the most frequently used words are placed centrally and in the biggest size in the cloud. The stop word function can be used to exclude words or to specify the number of words to be retrieved from the document.

2) **Correlation Tool**

It enables the researcher to identify the words that recur often in the text and the locations where correlations show terms with a similar pattern. In order to run Pearson correlation calculations, the text has been segmented. The numerical value that results from the software's analysis of the frequency with which words appear in the various segments is the basis for the correlations. The degree of relevance for each pair of words is also given. With the suppositions of a normal distribution, Pearson correlation is frequently used. However, numerous investigations have demonstrated that the Pearson correlation is strong enough to accept deviations from the aforementioned common assumption (Havlicek & Peterson, 1976; Fowler, 1987). Nonetheless, the findings should be interpreted with caution.

3) **Topics Tool**

A complex latent Dirichlet allocation technique is used by this instrument (LDA). A topic model presupposes that the text's words correspond to latent subjects. Additionally, it makes use of a limited set of themes and vocabulary terms that are regularly utilised by the topic. It is possible to identify term clusters and their distribution. using this tool. Furthermore, the number of topics can be set to optimise modelling.

4) **Scatter Plot Tool**

This tool's analysis features include primary component analysis, correspondence analysis, corpus similarity checking, and t-SNE analysis. The methods used in each of the four cluster plotting analyses produce a two-dimensional (or three-dimensional) presentation of the data in a multidimensional space (Van Der Maaten & Hinton, 2008). According to Cao and Wang "t-SNE tries to preserve local neighbourhood structure from high

dimensional space in low dimensional space by converting pairwise distances to pairwise joint distributions, and optimize low dimensional embedding to match the high and low dimensional joint distributions.” (Van Der Maaten & Hinton, 2008)

5) Collocates Graph: As a force-directed network graph, Collocates Graph displays keywords and concepts that occur in close proximity. A term's frequency can be determined by hovering over it , for keywords, it is the frequency in the document, for collocates, it is the frequency in the context of the linked keywords (Hendrigan, 2019).

Many researchers have used this free CAQDAS tool, Voyant Tools. This research was carried out with excel and Voyant-Tools as it freely provides an excellent range of tools for visualising qualitative data that has been quantitatively analysed for results. The visual network used the collocates graphs, which used Fatterman Reingold Layout Algorithm (Hetenyi et al., 2019; Sinclair & Rockwell, 2021).

Visualisation tools enables the researcher to see assumptions in the data that accurately reflect by the relationships between meaning units in the data set. However, as textual data is a coherent system of meaning units, there is always chance that quantitative analysis of qualitative data necessarily leads to considerable loss of information and thus, results to be interpreted carefully (De Caro et al., 2016; Gao & Wallace, 2017; Hendrigan, 2019).

During the use of voyant tools, the researcher reflected within the database again so that the ideas and concepts of documents and interviews were credibly expressed. Four final themes in descriptive accounts formed two core concepts ‘ROI methodology’ and ‘training effectiveness’ through exploring the relationship using the Fatterman Reingold layout algorithm between core concepts and established literature related to the ROI of the training framework of DISCOMs for Rural Electrification trainings. Once the relationships were

identified, the collocates graphs showing force-directed network graph explain the working of various concepts.

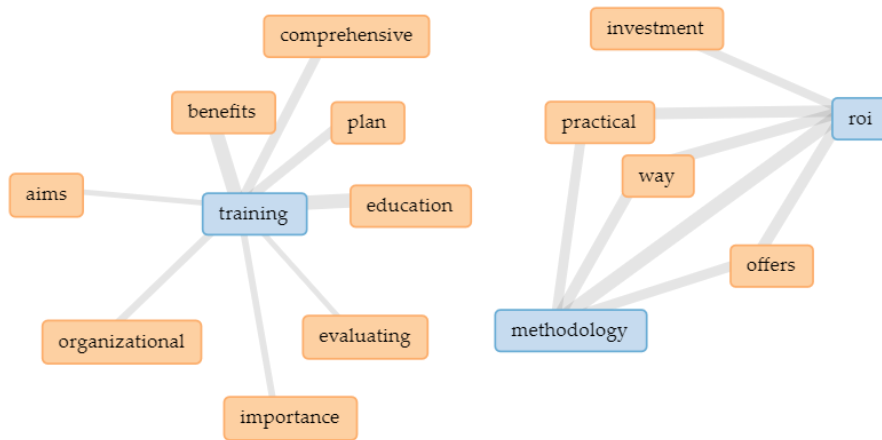


FIGURE 3.3: RELATIONSHIP 1 USING THE FUTTERMAN REINGOLD LAYOUT ALGORITHM

The above figure shows an association between initial categories and refined categories of Framework for ROI of rural electrification trainings of DISCOMs. The diagram represents the link between training to benefits, comprehensive plan, evaluation, organisation, etc. The other code, i.e., the methodology, is linked to ROI with practical ways and offers, and investment is associated with returning as it stands together.

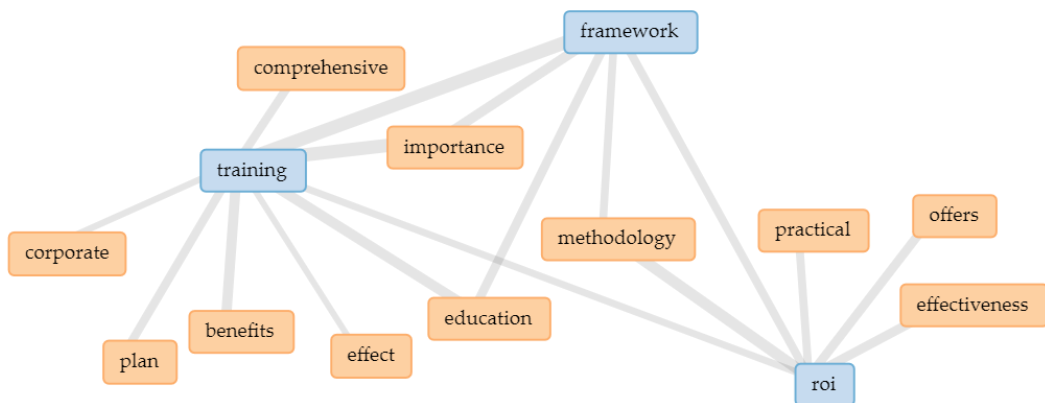


FIGURE 3.4: RELATIONSHIP 2 USING THE FUTTERMAN REINGOLD LAYOUT ALGORITHM

The above figure shows an association between refined categories and sub-themes of the Framework for ROI of Rural Electrification Trainings of DISCOMs. The diagram represents the link between training to benefits, effects, corporate, etc. Training is associated with a framework through education and importance, whereas the framework is associated with ROI through methodology and ROI is linked to effectiveness and reasonable offers.

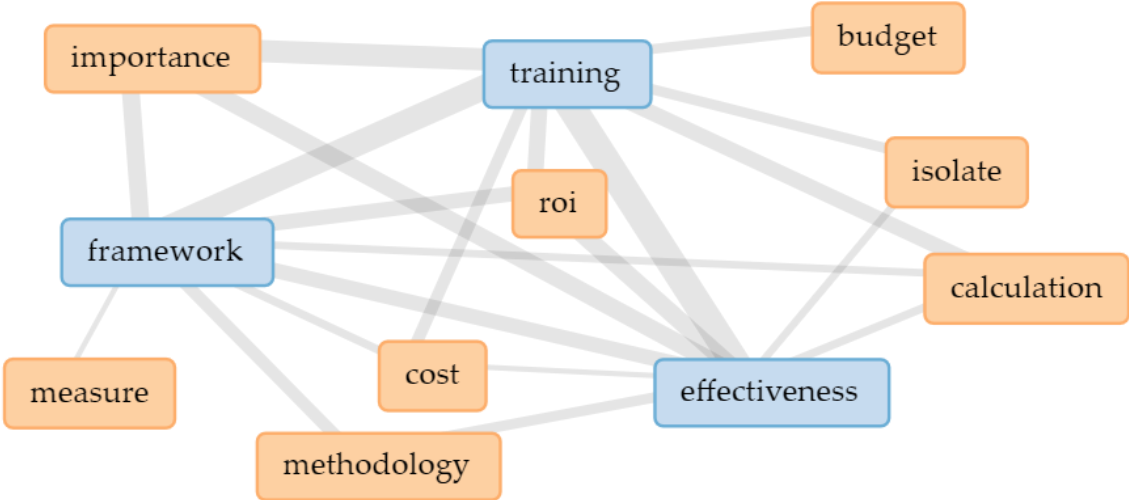


FIGURE 3.5: RELATIONSHIP 3 USING THE FUTTERMAN REINGOLD LAYOUT ALGORITHM

The above figure shows an association between sub-themes and the final theme of Framework for ROI of Rural Electrification Trainings of DISCOMs. The diagram represents the link between training, effectiveness and framework. All three codes are linked to each other through ROI calculation and cost; training is associated with budget. A framework is associated with measures and effectiveness through isolating effects

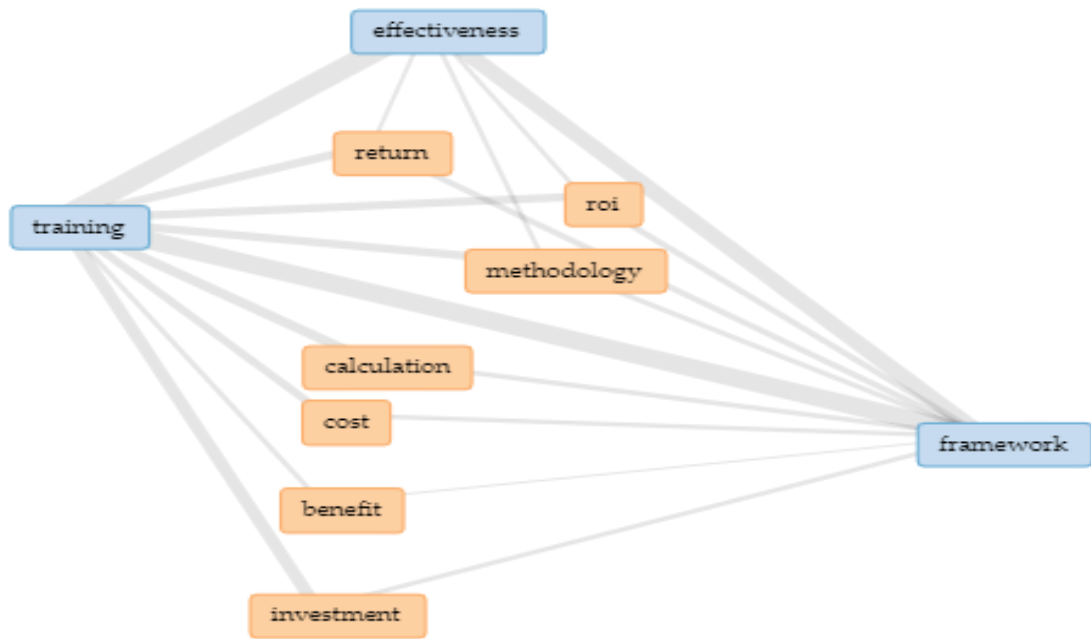


FIGURE 3.6: RELATIONSHIP 4 USING THE FUTTERMAN REINGOLD LAYOUT ALGORITHM

The above figure shows an association between the Final theme and the core concept of the Framework for ROI of rural electrification trainings of DISCOMs. The diagram represents the link between training, framework and effectiveness. All three codes are linked to each other through ROI, methodology and return. At the same time, training and framework are linked together through investment, benefits, cost and calculation.

DISCUSSIONS:

The conceptualisation framework in this study has been done through summarisation, beginning from transcripts to preliminary thoughts and open code, moving to the initial category and refined category, and finally emerging on sub-themes, themes and then core concepts. In this study, 42 documents were reviewed for conceptual framework. First, 102 transcripts reduced to 98 Preliminary thoughts, 60 open codes, 30 initial categories, 15 refined categories, seven sub-themes, and four themes reaching two concepts. All these data collected are relevant to this research problem and help us derive the core concept of the research; with the help of these stages, we made the

questionnaire to seek responses from the industry specialists to derive an answer for the research problem.

The conceptualization process ends with an initial protocol validated by the sample population's respondents leading to the final protocol. These are further refined based on expert opinions (Malalgoda et al., 2018; Snyder, 2019)

Table 3.8: Review Study Data Familiarization for Concept Derivation

Sr. No	Stages	Codes
1	Transcript	102
2	Preliminary thought	98
3	Open code	60
4	Initial category	30
5	Refined category	15
6	Sub-theme	7
7	Theme	4
8	Concept	2

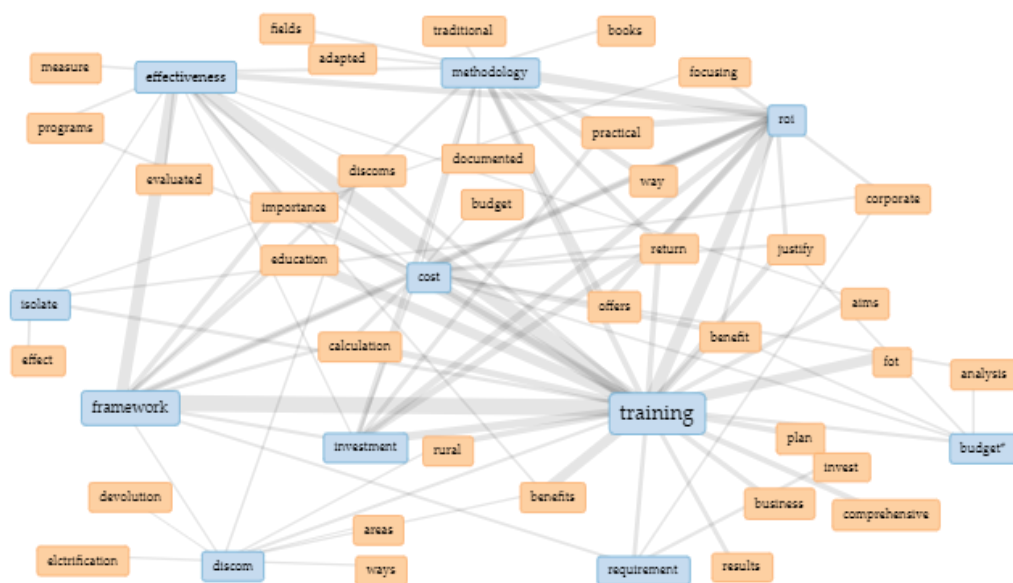


FIGURE 3.7: CONCEPTUAL LENS

The table below quotes the most frequently used terms—training, ROI, framework, methodology, benefits, effectiveness, etc. Training is associated with effectiveness, challenges, and education which can be rechecked in data reduction tools. Other key terms which are associated with one another are ROI; it is related to the framework, investment, return, cost, benefit, etc.

Table 3.9: Term Frequencies with Notable peaks by Review Transcript

Sr. No	Items	No of times term appear (f)	Sr. No	Items	f	Sr. No	Items	f
1.	Training	228	20.	Sustainable	19	39.	Requirement	9
2.	ROI	104	21.	Results	18	40.	Resources	9
3.	Framework	76	22.	Benefit	17	41.	Changing	8
4.	Methodology	64	23.	Essential	16	42.	Company	8
5.	Benefits	45	24.	Challenges	14	43.	Corporate	8
6.	Effectiveness	43	25.	Evaluation	14	44.	Data	8
7.	Investment	42	26.	Performance	14	45.	Evaluating	8
8.	Education	34	27.	Enhance	13	46.	Learning	8
9.	FOT	32	28.	Measure	13	47.	Limited	8
10.	Importance	32	29.	Calculation	12	48.	Measuring	8
11.	Comprehensive	28	30.	Corporate	12	49.	Outcomes	8
12.	Cost	24	31.	Organisational	12	50.	Overcome	8
13.	Way	24	32.	Aims	11	51.	Payoff	8
14.	Offers	23	33.	Structure	11	52.	Qualitative	8
15.	Plan	23	34.	Needs	10	53.	Various	8
16.	Practical	23	35.	Approaches	9	54.	Vast	8
17.	Business	22	36.	Help	9	55.	Capital	7
18.	Return	22	37.	Invest	9	56.	Forecast	7
19.	Development	20	38.	Programs	9	57.	Human	7

Qualitative research software is suggested to facilitate the creation of literature reviews that identify themes and contributions and how they are related, thus

enabling a particular insight into existing knowledge (Bandara et al., 2011; Wolfswinkel et al., 2013).

This research proposes the coding exercise in Ms excel, whereas the other analysis was made in Voyant tool, a web-based free qualitative data analysis software. Based on the identified codes and associations, categories and themes are developed and refined to reach the core concept of a conceptual framework.

3.4.2 OPERATING DEFINITION

Operating definitions help everyone develop the same understanding of the study (IvyPanda, 2021). Sometimes, people may differ in understanding different systems and procedures. Hence, operating definitions are necessary to bring everyone on the same platform. The same eliminates the ambiguity in thoughts (PQS, 2016). The more operational definitions, the more likely other researchers will replicate the same procedures (Anthony M. Graziano & Raulin, 2020). Therefore, the researcher defines clear and detailed operational definitions of this particular study as follows

Distribution Company (DISCOM): All the power distribution companies operating in India. In India, a power distribution company manages the whole distribution system, i.e., sub-transmission and distribution facilities, to deliver electricity to consumers, including rural areas.

Rural Electrification: Rural Electrification means access to affordable, reliable supply to rural consumers, from connection to all to power to all (Mukherji, 2018; Nhalur, 2018; Banerjee et al., 2015; Kulkarni & Anil, 2015; MoP GOI- RDS Scheme, 2021; Winkler et al., 2011)

Rural Electrification Training: Rural Electrification training refers to the training of distribution utilities carried out towards strengthening sub-transmission and distribution networks towards providing affordable, reliable supply to rural consumers from connection to all to power to all. The strengthening training modules exist for urban areas under DDUGJY/RGGVY Scheme (DDUGJY, 2015). The training modules of DISCOMs identified for rural electrification in providing affordable, reliable and sustainable power to all.

The World Bank defines **affordable** electricity as 30 kWh of electricity that costs no more than 5% of a household's income. (Kojima & Trimble, 2016). The affordability gets affected by

- Inadequate Govt Subsidy
- Shift from BPL
- Alternate Energy Cost

Reliability, i.e. continuous supply, is the supply of electricity to rural consumers for a minimum number of hours per the quality of standards for the DISCOMs (FOR -Forum of Regulator, 2015, 2018). The three most common are SAIFI, SAIDI, and CAIDI, defined in IEEE Standard 1366 (Kueck et al., 2004).

Sustainability is defined in terms of

- Energy Efficiency is not focused on as many areas lack energy
- The CO2 footprint is not the major focus
- Low use of modern Energy. (IEA, 2020; UNDP, 2015)

The rural electrification training refers to the DISCOMs' training of its employees towards providing affordable, reliable and sustainable power in the topics of

- Strengthening of sub-transmission and distribution network and distribution loss reduction
- Demand-side efficiency
- Metering billing and collection
- O&M of distribution substation (33/11 KV)

Effectiveness of Rural Electrification:

The effectiveness of rural electrification was considered to provide an affordable, reliable supply to rural consumers. From DISCOM's point of view, the effectiveness of rural electrification is providing affordable, reliable supply to rural consumers by strengthening its sub-transmission and distribution network. Hence, the training outcome regarding return on training investment is measured towards this goal.

3.5 LIMITATIONS

1. The study focuses on the rural electrification training of DISCOMs employees only, whereas training on contractual workforces of DISCOMs is not considered for this study.
2. The effectiveness of Rural electrification training programs was considered regarding organisational performance. The effectiveness of training design trainee characteristics will be out of the scope of the study. In addition, other factors which may not bear any relationship with these elements will be out of the scope of the study.
3. The research does not cover the rural electrification training beyond DISCOMs boundary. Thus, the study does not include Electricity Franchisee's cooperative societies engaged in electricity distribution such as Circilla Electricity Cooperative Society (CESS), Anakapalli Rural Electric Cooperative Society Limited (ARECS), The Hukkeri Rural Electric Co-operative Society Ltd (KRECS) etc

3.5.1 CONCEPTUAL LENS AND BIASES

The conceptual lens of a researcher is not free from biases as the researcher's own beliefs and philosophy. Thus, throughout developing a conceptual lens, the researcher needs to be mindful and contemplative to apply intuition and creativity for including, omitting, or going further (Stewart et al., 2017). As the philosopher Hilary Putnam (1987, 1990) explained, biases are integral to the lens.

For this particular research, the validity and reliability of the research were enhanced with methods of adhering to

Rich, thick description Ryle (1949), Geertz (1973) &

Searching for disconfirmation (negative case analysis) (Booth et al., 2008a; Rose & Johnson, 2020).

Prolonged engagement (Lather, 1986), (Pink & Morgan, 2013)

Member checking (Lincoln & Guba, 1986; Rose & Johnson, 2020)

Triangulation (Denzin & Lincoln, 1978, 2011; Thurmond, 2001), (Burr, 1998; Thurmond, 2001).

Crystallization (Crabtree & Miller, 1999; J Borkan) (Norman K Denzin; & Yvonna S Lincoln, 2011), (Rose & Johnson, 2020).

The use of rich & thick definitions helped the researcher remove bias while capturing the respondents. The searching for disconfirmation and prolonged engagement increased the researcher's immersion in data, further increasing the research's validity. The member checking was also used, which triangulated the researcher's biases. The researcher followed data triangulation to narrow down the qualitative lens and paradigm assumptions bias. Through triangulation, the researcher searched the convergence among multiple and various sources of information (documents and interviews) to form the relevant categories and themes in the study. The researcher undertook triangulation by employing experts' lenses as a validity procedure. A systematic process was adopted, and data was sorted out by finding common categories and themes by eliminating the overlapped areas. The research performed through this approach is valid because the procedure relies on multiple forms of data rather than single evidence (Denzin & Lincoln, 1978). Through crystallisations, the researcher has paused the immersion to have more reflexivity and his own belief to have a minimum bias in the conceptual lens.

The research quality is detailed in the next section.

3.6 RELIABILITY AND VALIDITY

Research Quality or Research Rigour, in qualitative terms, is a means for establishing trust or confidence in the findings of a research study. It allows the researcher to establish consistency in the research process used over time. It also accurately represents the population studied (Ritchie J, 2003).

Denzin and Lincoln's description of qualitative research, a long-standing pillar in the field, had the foundation for research quality:

“Qualitative research involves the studied use and collection of a variety of empirical materials – case study; personal experience; introspection; life story; interview; artefacts; cultural texts and productions; observational, historical, interactional, and visual texts – that describe the routine and difficult moments and meanings in individual lives. Accordingly, qualitative researchers deploy a wide range of interconnected interpretative practices to understand the subject matter better. However, it is understood that each practice makes the world visible differently. Hence there is frequently a commitment to using more than one interpretative practice in any study” (Denzin & Lincoln, 2011).

Strategies compatible with a qualitative viewpoint are outlined, expanding on the epistemological and theoretical conceptualizations of Lincoln and Guba, in order to ensure validity and prove the study's veracity. A summary of the historical evolution of the validity criteria that have appeared in the literature over the years is investigated. It is suggested that the term "rigour" be used instead of "trustworthiness" and that the concepts of "reliability" and "validity" be rethought and applied again in qualitative research. It is also suggested that strategies for ensuring rigour to be incorporated during the qualitative research process rather than being assessed only after the investigation is complete.

Before the full implementation of the research design, preliminary steps of the study must be performed, from identifying participants, contacting and negotiating initial consents, establishing and preserving trust as well as

identifying participants. These steps of qualitative research are also repeated several times in the process. Once the design is unfolded, the design elements should be placed appropriately, and the researcher should be flexible with minimal control. There is constant reassessment and reiteration throughout the research. Data is collected through interviews using multiple methods, including physical meetings, telephone conversations (some recorded), and virtual meetings (online). Whatever the source, the only means of research and collections are information during which quality must be ensured. Therefore, instead of merely adhering to established rigour requirements once the study is over, relevant actions must be carried out to guarantee that rigour had been addressed to throughout the research process.

The researcher is the central point of qualitative research and thus co-creator of the meaning (Charmaz Kathy, 2006). The existing knowledge of the researcher should not add any bias to the research process (Viswanathan et al., 2008; Yeh & Inman, 2007). Lincoln and Guba (1989) proposed different terminology for naturalistic investigators to distance themselves from the positivist paradigm and introduced trustworthiness to address the criticism of quality research based on personal impression, lack of reproducibility, and lack of generalisation research (Shenton, 2004). Trustworthiness is used as the central concept in their framework to appraise the rigour of a qualitative study. Researchers use a variety of descriptions to define trustworthiness. The term "trustworthiness" relates to the quality, authenticity, and truthfulness of qualitative research findings. Trustworthiness is described in different ways by researchers.

The trustworthiness with the following criteria to be considered in pursuit of rigour in research (Lincoln & Guba, 1995). These trustworthiness criteria are:

- i) credibility (in preference to internal validity),
- ii) transferability (in preference to external validity),
- iii) dependability (in preference to reliability),
- iv) confirmability (in preference to objectivity),

Yin (2011) offers numerous sources of evidence as a foundation for dependability and believability (Yin, 2011). Validity and dependability are rejected by Corbin and Strauss (2008) in favour of credibility (Corbin; & Strauss, 2008). Credibility serves as a sign of the reliability of discoveries, which is demonstrated in the crystallisation of several plausible perceptions reconstructed from the evidence. It's not about being validated; rather, it's about coming up with a different perspective that incorporates the depth, complexity, and rigour desired in qualitative research (Flick, 2018). Trustworthiness stems from the co-construction and interpersonal contact with participants and the following data (Guercini & Raich, 2014).

Positivists usually question the trustworthiness of the qualitative researcher. It will be because the concepts of reliability and validity could not be addressed the same way researchers often address them in quantitative research. However, many investigators use different notations to distance themselves from positivist thinking (Guba, 1982; Lincoln & Guba, 1986).

The concepts of validity and reliability in measuring the trustworthiness of the research are not universally agreed upon by all researchers. Rather many researchers have developed their concepts to see validity within qualitative research (Rolfe & Rolfe, 2006; Rose & Johnson, 2020; Shenton, 2004). Validity is assessing the findings' accuracy from the perspective of the researcher, the participants, and/or the research's users (Creswell & Miller, 2000; Lincoln & Guba, 2013). Reliability refers to the soundness of the research, particularly about the acceptable methods chosen and, therefore, how those methods were applied and implemented during a qualitative research study. Reliability asks us to question the consistency of the methodological process, hopefully remaining reasonably stable over time and across researchers and/or methods engaged (Miles et al., 2020). Justifying the approaches employed, since transparency in the analytical steps raises the credibility of a study (Rose & Johnson, 2020). Additionally, reliability highlights the

thorough research's coherence and clarity, boosting the likelihood that future researchers will (Fetters et al., 2013; Lewis, 2015).

Credibility (internal validity)

Credibility determines that the research truly measures what was intended to measure and whether the results are truthful or not). The choice to select the procedure for the validity test is governed by two perspectives –

- i) the lens researcher selects to validate the research,
- ii) paradigm assumptions of the researcher (Creswell & Miller, 2000)

Procedure to check validity includes the researcher's strategies to check the credibility. Validity does not refer to data, but the inference is drawn from the processing of data (Parveen & Showkat, 2017). When the researcher refers to the lens in research, he uses a viewpoint to establish the validity. Qualitative researchers bring a different lens towards validity than they brought to traditional quantitative studies. However, the lens provided by the researcher is their own or may belong to study participants. Hence it may not be the only perspective to choosing a validity procedure (Miles & Huberman, 1994; Rolfe & Rolfe, 2006). Paradigm assumptions of researchers and worldviews may also govern the selection of procedures (Lincoln & Guba, 1995). The various methods of improving internal & external validity, i.e. credibility & transferability, is detailed below

Member checking:

Member checking entails sharing (anonymous) data from research participants and seeking their feedback on the process. "Opportunities for the researcher to test her findings, interpretations, and explanations inside the culture she is investigating," says one researcher (Lincoln & Guba, 1986; Rose & Johnson, 2020).

Critical reflexivity and subjective positionality:

Reflexivity is the examination of one's own beliefs, judgments, and practices during the research process and how these may have influenced the research. (Warwick, 2021). According to Finlay (1998), it requires openness and

acceptance that the researcher is a part of the research (Finlay, 1998). Being critically reflexive allows researchers to question assumptions about our subjectivities, especially those who call the shots throughout the research process (Miller et al., 2015). Furthermore, many of these subjective viewpoints must be questioned before formulating or implementing a study (Polit & Beck, 2010). During this process, self-awareness, politics, intent, and motivation are all important considerations. In qualitative research, since the researcher is research instrument, reflexivity has been recognised as a crucial component for validity which can be enhanced by the researcher's deliberate, perceptive articulation. The entire research process, including the materials, the techniques, the analysis, and the presentation of the findings, is influenced by the researchers' subjective positionalities (Morgan, 2018; Rose & Johnson, 2020).

Rich, thick description

The term thick descriptions were first used by Ryle (1949) and later by Geertz (1973), who applied it for research in ethnography. Lincoln and Guba (1985) describe thick descriptions are most important for ensuring external validity. By describing a phenomenon in detail, researcher is able to determine how the findings are transferable to different contexts, people, and circumstances. The phrase "detailed description" refers to a thorough report of fieldwork in which the researcher makes explicit and contextualises the patterns of cultural and social relationships. (Holloway, 1997).

Constructing narratives and analyses that provide detailed, contextual detail about social, political, or economic occurrences improves a qualitative researcher's overall sense of embeddedness and understanding of the "field" they are researching. Increased focus on the information's depth and detail gives readers a sense of realism, generating compassion for participant perspectives or providing a better-contextualised knowledge of an event. These descriptions could originate from the researcher or author and come from participant statements, narratives, or opinions (Furman et al., 2006). The type and complexity of description are most likely influenced by

paradigmatic and methodological factors, as well as cultural traditions. It is a reflexive account, written in the first person, in which the status and role of the researcher are made explicit, though Geertz (1973) does not take a moral position on what he is observing. It wears its analysis lightly, but many field notes and inductive analysis lie behind the account, even if this is not made explicit. It is theoretical, explanatory and descriptive.

Searching for disconfirmation (negative case analysis)

Researchers should check for inconsistencies in the study, whether theories, facts, or inconsistent material contradict the research's themes or analysis. They should also look for alternative explanations for how their research frames and perceives the phenomenon (Maxwell, 2016). Researchers strengthen the validity of the statements they make through their research by data and evidence that both support and contradict generalisations (i.e., negative examples) on a topic. The social and political world is complicated, and addressing these differences helps to give a more realistic (and credible) picture of the topic of interest (Booth et al., 2008a; Rose & Johnson, 2020).

Peer debriefing

In qualitative research, it is frequently advantageous to collaborate with someone who has strong methodological and analytical skills but is less involved in the research topic or process than the lead researcher. By challenging methodological practises, analytical frameworks, or analytical approaches, along with the research's general clarity, this person (or people) contributes to the validity of the study. Specifically, graduate students may be able to learn about this process through interactions with research supervisors and committee members. Writing clubs, reading groups, and teamwork, on the other hand, may help everyone. In addition, we have discovered that peer debriefing can help researchers build a variety of analytical schemes (including coding), improve methodological competencies, and strengthen trusting connections between the researcher and the peer (Spall, 2016). Maxwell (2013) advises that one validity check would be to seek comments from those familiar with the environment and those who are not (Maxwell, 2016).

Prolonged engagement

The amount of time spent "in the field" is a criterion for qualitative research as it enhances validity by increasing engagement (Lather, 1986). Like the thick, rich description, prolonged involvement supports the researcher's (implicit or explicit) understanding of the phenomenon in question. Although academics are increasingly acknowledging that intensity of involvement may be a far better metric than strictly chronological engagement, greater time enhances the possibility of acquiring more data, boosting the validity of the findings (Pink & Morgan, 2013).

External auditor and audit trail

An external auditor can examine the complete scientific study, including the findings and analysis and the methodology used to arrive at the conclusions. An external auditor, unlike a peer debriefing partner, is not unfamiliar with the researcher or the research project. The auditor may study final reports or look at specific components of the project, such as field notes, interview transcripts, focus group films, and so on (Kleijn & Leeuwen, 2018). This expert can also look at more significant issues like the alignment of the study questions and, as a result, the generated data. The presence of an external auditor may be interpreted as availability of an audit trail, which is, documentation that backs up the procedures used during the research process, boosting the idea that the data gathered through these methods is more typical of the real world (Cutcliffe & McKenna, 2004).

Triangulation

Triangulation is the determination of an unknown end by using the location of two fixed points. This trigonometric premise was used in research derived from the metaphor from construction, surveying and navigating at sea to find an unknown point using two known points. In qualitative research, triangulation is used to strengthen the validity of the research and increase the ability to interpret the findings (Denzin & Lincoln, 1978, 2011; Thurmond, 2001). Triangulation requires identifying the multiplicity and simultaneity of cultural frames of reference (Atkins et al., 2005) to achieve

the most accurate description and presentation of a scenario, various tactics must be used. Many different approaches to a phenomenon are thought to help researchers "discover" it more clearly and accurately. Researchers believe that by approaching a phenomenon from numerous angles, they will be able to "find" it more clearly and accurately.

Burr (1998) used multiple triangulations to obtain a more comprehensive view of family needs in critical care. (Burr, 1998; Thurmond, 2001).

Denzin (1978) suggested a minimum of four different forms of triangulation that could contribute to boosting validity decades ago:

- Various data collection methods are frequently compared for consistency;
- Data sources are examined on a regular basis for consistency;
- Numerous analysts can analyse findings; and
- information is frequently interpreted using multiple paradigms or theories. (Denzin & Lincoln, 2011)

Accordingly, different types of triangulations exist (Lisa et al., 2015), such as

- **Data triangulation:** It uses different types of sources
- **Investigator triangulation:** It uses different investigators
- **Theory triangulation:** Theory triangulation involves the use of multiple perspectives to interpret a single set of data
- **Methodological triangulation:** The analysis using a variety of qualitative and/or quantitative approaches to compare the findings of surveys, focus groups, and interviews to see if they are consistent.
- **Environmental triangulation:** This type of triangulation makes use of various locations, settings, and other key factors related to the environment in which the study was conducted, such as the time, day, or season. The key is to determine which environmental factors, if any, may influence the information gathered during the study.

Furthermore, many types of analysis are frequently used to increase the rigour of the research (Leech & Onwuegbuzie, 2007). The kind of triangulation needed depends on a number of ontological, epistemological, theoretical, and

methodological considerations. While various studies emphasise the importance of triangulation (Lacity & Janson, 1994; Onwuegbuzie et al., 2012; Stewart et al., 2017), little operationalizes the actual process (Bekhet & Zauszniewski, 2012). Based on convergent coherence from numerous sources, qualitative codes, themes, and overall analyses can be more coherently justified, increasing the study's validity.

For this particular research, 'the triangulation' validity procedure was used within qualitative lens and paradigm assumptions. Through triangulation, the researcher searched the convergence among multiple and various sources of information (documents and interviews) to form the relevant categories and themes in the study. The researcher undertook triangulation by employing a researcher lens as a validity procedure.

Crystallization

Crystallization is the process of temporarily stopping studying the data (immersion) to reflect on the analysis, and experience and attempt to identify and articulate patterns or themes noticed during the immersion process. Immersion is when researchers immerse themselves in the data collected by reading or examining some portion of the data in detail (Crabtree & Miller, 1999; J Borkan, 1999). While discussing how hidden assumptions in a research project are reflected and refracted during the research process, Laurel Richardson brought the metaphor of a crystal to us (Rose & Johnson, 2020; Stewart et al., 2017).

Crystallisation is used within the qualitative interpretive community (Crabtree & Miller, 1999; Denzin & Lincoln, 2011). In their work on family physicians, Miller and Crabtree (1994) depict crystallisation as a series of four steps. First, as steps within the procedures used to organise knowledge collection and analysis, the crystallisation phase coexists and integrates with immersion (Crabtree & Miller, 1999). As per Crabtree and Miller (1999), the synergy of immersion and crystallisation in qualitative research is similar to the combination of "bread and butter".

Before understanding the surrounding world, the initial step of the crystallisation journey is to understand "the self." This is frequently necessary

for the qualitative management researcher's quest for rigour. Crystallization is based on an intimate grasp of the study and the researcher's position to view the approach with an openness that allows for discoveries that would otherwise be lost (Ellingson, 2009; Stewart et al., 2017).

Methods are established within the "instruments of knowledge collection," such as observations, interviews, and pictures. In contrast, crystallisation provides dense and detailed descriptions using a variety of forms, genres, and modes to incorporate the researcher during a reflective process and give them the chance to practise their art (Ellingson, 2008; Polsa, 2013). Crystallization's inclusion in proper methodological techniques encourages the innovation and investigation of the social environment while also stretching traditional bounds, adding value and depth to quality management research (Rose & Johnson, 2020).

Richardson's crystallisation notion is a "post-modern rethinking of standard, (post) positivist methodological triangulation" that crosses art and science research divide to accommodate qualitative research's messiness and to demolish the concept of a single fact in order to portray various truths by providing detailed explanations from numerous angles (Ellingson, 2009). Richardson (1994, 2000a, 2000b), a postmodern and post-postmodern sociologist, criticises the triangulation approach as having an objective, two-dimensional, rigid, and static lens and adoption of crystallisation "a more complete, holistic and authentic study of our own" (Richardson et al., 2011).

Transferability (External Validity)

In qualitative research, transferability is synonymous with generalisability or external validity. The concept of transferability is established by showing readers that the findings of a research study may be applied to various locations, circumstances, times, and populations. It is crucial to note that the researcher cannot verify whether the study's conclusions will apply. Instead, the researcher's role is to provide evidence that might be applicable (Bashir et al., 2008; Petty et al., 2012; Rose & Johnson, 2020). This may sound complicated and wishy-washy, but Lincoln & Guba (1985) expressed beautifully, "It is, in summary, not the naturalist's task to provide an index of

transferability; rather, it is his or her responsibility to provide the information base that allows potential applicers to make transferability judgments” (Lincoln & Guba, 1995). Qualitative researchers are encouraged to produce what Geertz (1973) calls a thick description— that is, rich accounts (Geertz, 1973) of the details of culture are helpful in transferability. According to Lincoln and Guba, a detailed description provides others with a database from which to make decisions about the potential transferability of findings to others (Furman et al., 2006; Polit & Beck, 2010).

Dependability (Consistency/Reliability)

Qualitative research methods are widely used in applied policy research. Qualitative research uses a bulk of data – text from document interviews and transcripts (Ryan & Bernard, 2016). In addition, object-oriented forms like audio segments, videos, and visual images are also considered for this purpose (MacQueen, 1998). However, researchers had proposed a general guideline to analyse such data (Denzin & Lincoln, 2011), and it only addresses definite queries of methodological importance (Carey et al. 1996). Research is reliable if results accurately represent the population and if they are consistent over time. Reliable research reproduces the same results under the same methodology (Alan Bryman, 2012). The result of qualitative research is based on the generated code. Inter-coder reliability must be there if in-vivo codes are generated from open-ended data (Sandelowski, 1986). This qualitative study; identified codes, categories, and themes that appeared in text passages or another media segment. The researcher compiled the codebook with a list of defined codes aligned with the respective theme. Then to check the reliability, the researcher judged each pre-determined text segment to see whether a specific code was present or not. This is known as inter-coder reliability (Mays et al., 2005).

Researchers should take "auditing" approach and involve another researcher when considering dependability. This requires making sure that full records of every step of the research process—problem formulation, respondent selection, fieldwork notes, interview transcripts, data analysis etc.—are available. Then, peers would serve as auditors to determine how closely

proper procedures have been followed, maybe during the research and definitely at the conclusion (Kleijn & Leeuwen, 2018). This would include assessing the extent to which inferences can be justified. Using methodological triangulation in data processing, such as coding in excel and coding through software, reflective project appraisal increases dependability (Shenton, 2004; Thomas & Magilvy, 2011).

Confirmability

Confirmability is focuses on ascertaining that the researcher can be shown to have acted in good faith while acknowledging the impossibility of complete objectivity in social research; in other words, it should be obvious that he or she has not overtly allowed personal values or theoretical inclinations to sway the conduct of the research and the findings derived from it. Establishing confirmability should be one of the researchers' goals, according to Lincoln and Guba. Subjectivity and reflexivity are unquestionably crucial in qualitative research procedures (Rose & Johnson, 2020). While positivists and post-positivists might use the term “bias,” subjectivity is the views, experiences and propositions the researcher brings into this research endeavours. Miles and Huberman consider that a critical criterion for confirmability is how the researcher admits their predispositions and understands “its self” (Miles et al., 2020).

Authenticity: In addition to these four trustworthiness criteria : Lincoln and Guba propose criteria of authenticity to address difficulties with the larger political implications of research (Lincoln & Guba, 1995). These are the criteria (Alan Bryman, 2012):

- Fairness- Is the research fairly representing the various points of view among members of the social setting?
- Ontological authenticity- Is the research assisting members in gaining a better understanding of their societal context?
- Educative authenticity- Does the research assist members in better appreciating the perspectives of others in their social setting?

- Catalytic authenticity Has the research served as a catalyst for members to take action to improve their situation?
- Tactical authenticity- Is the research empowering members to take the necessary action steps?

3.7 INITIAL PROTOCOL

The conceptual lens and review questions form the basis of the initial interview protocol (Bolderston, 2012). This protocol consists of twenty-nine (29) questions bifurcated into four sections, namely:

Section-1 Demographic Detail:6 questions

Section 2: General questions based on training experience of the respondent (GTQ): 6 questions

Section 3: Kindly share your training-based experience (TBE): 4 questions

Section 4: Kindly share your views on the calculation of cost of training (CCT), calculation of benefits of training (CBT), ROI methodology (RM) and effectiveness of training (ET)- 13 Questions

Each question developed under each protocol section has a unique scope defined against the same question.

TABLE 3.10: INITIAL PROTOCOL & PROFILE OF RESPONDENTS IN PROTOCOL VALIDATION

Detail	Response
Age (Coded as A) [1] Below 25. [2] Between 26 and 35. [3] Above 35	
Gender (Coded as G) [1] Female. [2] Male.	
Level of Education (Coded as LE) [1] Undergraduate. [2] Graduate. [3] Postgraduate	
Name of the Organisation (Coded as ON)	
Current Role (Coded as CR) [1] Training Coordinator of DISCOMs. [2] Head of Training of DISCOMs. [3] Head of HR of DISCOMs. [4] Nodal Training	

Officer of DISCOMs. [5] Training Coordinator of Govt Programmes. [6] Faculties conducting training of DISCOMs	
Experience / Length of service in this role in years (Coded as SL) [1] below 3. [2] between 3 and 9. [3] between 9 and 18. [4] Above 18	

Section 2: General questions based on the training experience of the respondent (coded as GTQ)	
GTQ 1	The number of employees participating in training last year?
GTQ 2	Number of years your organization has been providing training?
GTQ 3	What is your total training budget?
GTQ 4	Number of years you have been involved in a training function in this or any other position (in any organization) [1] 0-5 years. [2] 6-10 years. [3] 11-15 years. [4] More than 15 years.
GTQ 5	State of the DISCOM.
GTQ 6	Size of DISCOMs (include fulltime, part-time, and contract employees) [1] 1 – 1000 [2] 1,001 – 5,000 [3] 5001 – 10,000 [4] 10,001 – 20,000 [5] 20,001 – 40,000 [6] Over 40,000

Section 3: Kindly share your training-based experience (coded as TBE)	
TBE 1	Are intangible costs measurable? [1] Yes. [2] No.
TBE 2	Are intangible benefits measurable? [1] Yes. [2] No.
TBE 3	Does Rural Electrification training in DISCOMs bring any significant enhancement in performance for the power sector? [1] Yes. [2] No.
TBE 4	Is the investment in Rural electrification training programs for DISCOMS worth the return for DISCOMs? [1] Yes. [2] No.

Section 4: Kindly share your views on the Calculation of cost of training (coded as CCT), Calculation of benefits of training (coded as CBT), ROI Methodology (coded as RM) and Effectiveness of training (coded as ET).		
CCT 1	Over what period cost is calculated?	
CCT 2	What costs are incurred during training programs?	
CCT 3	How can we measure intangible costs?	
CBT 1	What are the benefits of Training in DISCOMs?	
CBT 2	What are the intangible benefits of Training in DISCOMs and the Power Sector?	
CBT 3	How can we measure intangible benefits?	
CBT 4	Over what period benefit is calculated?	
CBT 5	What are the short-, medium- and long-term benefits of training?	
CBT 6	According to you, what benefits can the training framework bring in for rural electrification?	
RM 1	What are the important measures of return on investment in Training?	
RM 2	How ROI methodology is helpful for training Investment of DISCOMs for Rural Electrification	
ET 1	What factors impact the results of ROI?	
ET 2	How to isolate the effect of training?	

3.8 VALIDATION OF PROTOCOL

As intrinsic to qualitative research, the initial protocol developed from the conceptual framework is not free from any bias arising from researchers' philosophical backgrounds, level of immersion in data, attention to both description and interpretation of data analysis, and consideration of context during data analysis. Thus, the validation of the protocol is of immense importance. Furthermore, data triangulation and crystallisation methodologies validate the protocol (Ellingson, 2008).

The initial interview protocol was pilot tested with four experts, and thus data validation of literature review with interview transcripts was achieved.

TABLE 3.11:PROFILE OF EXPERTS FOR VALIDATION OF INITIAL PROTOCOL

SI No	Years of Experience	Organisation	Respondent's Role in Organisation
1	Above 18	Energy Consultants	Faculties conducting training of DISCOMs
2	Above 18	Telangana Southern Power Distribution Company Limited (TSSPDCL)	Training Coordinator of DISCOMs
3	Between 9 and 18	MP Paschim Kshetra Vidyut Vitaran Co.Ltd. Indore (MPPKVVCL)	Nodal Training Officer of DISCOMs
4	Between 9 and 18	Jodhpur Vidyut Vitran Nigam Limited (JdVVNL, Jodhpur)	Training Coordinator of DISCOMs

The interview transcripts were coded and categorised similarly to the literature review. Both were further synthesised with the voyant tool.

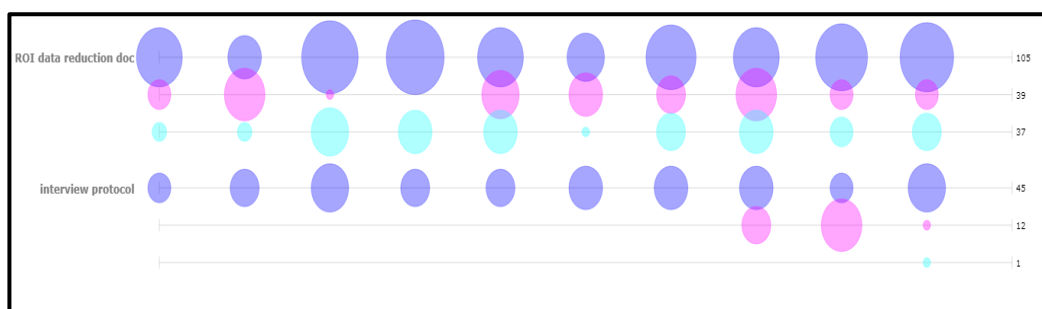


FIGURE 3.8: TRIANGULATION
(Voyant Tool Output using Bubble Line Diagram)

The bubble line diagram represents the correlation between these two documents, ROI data reduction and interview protocol. ROI data reduction document consists of initial codes generated from the literature review studied under this study and provides this thesis's foundation. The interview protocol document initially consists of Interview responses of 'four' experts; their responses were recorded and interpreted to generate codes as in the ROI data reduction document. The codes generated from both the documents were similar, which validated this interview protocol.

In the figure, codes generated from both the documents are training, ROI and effectiveness. In ROI, the data reduction document count for training was 105; for ROI, it is 35, and for effectiveness, it is 37. In the Interview protocol

document, the count for codes training, ROI and effectiveness stand to be 45, 12 and 1, respectively. The ten bubbles represent the ten equal segments in which the document was analysed to count the codes. Dark blue colour bubbles represent training, Pink colour bubbles represent the code ROI, and light blue colour bubbles represent the code effectiveness.

Therefore, the similar codes generated from both documents validate this interview protocol and can be used to collect further responses.

For this research, ‘the triangulation’ validity procedure was used within qualitative lens and paradigm assumptions. Through triangulation, the researcher searched the convergence among multiple and various sources of information (documents and interviews) to form the relevant categories and themes in the study. The researcher undertook triangulation by employing a researcher lens as a validity procedure.

3.9 PROTOCOL

The Interview protocol for the study was developed based on the conceptualised framework. First, the industry experts have validated the protocol that led to the conceptualised framework. Then, after incorporating the necessary changes, the protocol was validated to make it final. Finally, an expert validated the final protocol, and no additional concept has evolved. Thus, the interview protocol consists of 29 questions bifurcated into four sections.

TABLE 3.12: FINAL PROTOCOL

Details	Code
SECTION 1: Profile of the Respondents	
Age	A
Gender	G
Level of Education	LE
Name of the organisation	NoO
Current role	CR
Experience / Length of service in this role in years	LOS
SECTION 2: General questions based on the training experience of the respondent	

Number of employees participating in training last year?	GTQ 1
Number of years your organization has been providing training?	GTQ 2
What is your total training budget?	GTQ 3
Number of years you personally have been involved in a training function in this or any other position (in any organization)	GTQ 4
State of the DISCOM.	GTQ 5
Size of DISCOMs (include full-time, part-time, and contract employees)	GTQ 6
SECTION 3: Kindly share your training-based experience	
Are intangible costs measurable?	TBE 1
Are intangible benefits measurable?	TBE 2
Does rural electrification training in DISCOMs bring any significant enhancement in performance for power sector?	TBE 3
Is the investment on rural electrification training programs for DISCOMS worth the return for DISCOMs?	TBE 4
SECTION 4: Kindly share your views on Calculation of cost of training, Calculation of benefits of training, ROI Methodology and Effectiveness of training	
Part 1: Kindly share your views on Calculation of cost of Training	
Over what period of time cost is calculated?	CCT 1
What costs are incurred during training programs?	CCT 2
How can we measure intangible costs?	CCT 3
Part 2 : Kindly share your views on Calculation of benefits of training	
What are the benefits of training in DISCOMs?	CBT 1
What are the intangible benefits of Training in DISCOMs in general and for power Sector?	CBT 2
How can we measure intangible benefits?	CBT 3
Over what period of time benefit is calculated?	CBT 4
What are the short-, medium- and long-term benefits of training?	CBT 5
According to you what benefits can training framework bring in for rural electrification?	CBT 6
Part 3: Kindly share your views on ROI Methodology	
What are the important measures of return on investment of Training?	RM 1
How ROI methodology is useful for training Investment of DISCOMs for Rural Electrification?	RM 2
Part 4: Kindly share your views on Effectiveness of training	
What factors impact on the results of ROI?	ET 1
How to isolate the effect of training?	ET 2

3.10 FRAMEWORK METHODOLOGY

Framework analysis provides straightforward, transparent results and offers conclusions that can be linked to the original data (Ward et al., 2018). This results in the constant refinement of categories and themes that lead to developing a framework (Ritchie et al., 2003). As a result, the framework approach is one of the most versatile approaches to qualitative research. With the advantage of a systematic approach, the researchers are equipped with more focus on the participants and the flexibility it provides them to adopt any unforeseen (Gale et al., 2013; Hackett & Strickland, 2018). Table 3.13 presents some relevant studies using Framework Analysis.

TABLE 3.13: RELEVANT STUDIES USING FRAMEWORK METHODOLOGY

SI No	Author	Year	Details
1.	S Sofaer	2002	To develop a conceptual framework for and research
2.	Swallow, V., Newton, J., & Lottum, C. V	2003	Use of Framework analysis along with MS Excel to develop a conceptual framework
3.	Murtagh J, Dixey R, Rudolf M	2006	To use a three-stage framework analysis methodology
4.	Rashidian A, Eccles MP, Russell I	2008	To develop a conceptual framework for the execution of guidelines, prescriptions, and recommendations.
5.	Srivastava et al.	2009	Framework analysis is the best tool to assess policies.
6.	Smith, J	2011	Three-stage Framework methodology
7.	K Gale et al.	2013	The Framework method is a systematic and flexible approach to analysing qualitative data
8.	Struik, L. L., & Baskerville, N. B.	2014	Using a three-stage framework analysis
9.	Sally Parkinson	2016	Framework is an important addition to qualitative psychology methodologies, providing a pragmatic, adaptable, and rigorous approach to data analysis.
10	C. Lacity et al.	2016	To provide a framework that categorises numerous text analysis methodologies as

			a part of qualitative methods more accessible to researcher
11.	Goldsmith, L. J	2017	Details steps of Framework analysis analysis to conduct cross-sectional analysis for policy
12.	Mason, W., Mirza, N., & Webb, C	2018	Using Framework analysis in social research
13.	Hackett A, Strickland K	2018	Working example of framework analysis
15.	Robertshaw, D., & Cross, A	2019	Using a Framework analysis to understand views and experiences from the perspective of careers, families of healthcare professionals
16.	Aggarwal Atul	2019	Three-stage framework methodology for developing a framework to introduce retail competition in Indian electricity sector.

Source: Compiled by the Researcher

Framework Analysis for data analysis is adopted in this research as it particularly suits the descriptive analysis of cross-sectional data which quantifies the data under the investigation. Second, the researcher's interpretation of the participants' experiences is open and honest. Additionally, the three interrelated steps of framework analysis offer systematic data analysis (Ritchie and Lewis 2003).

The framework analysis process is shown as

TABLE 3.14: THREE STAGES IN FRAMEWORK METHODOLOGY

Stages		
Data Management	Descriptive Accounts	Explanatory Accounts
<ul style="list-style-type: none"> • Becoming familiar with the data-reading and re-reading • Identifying initial themes /categories • Developing a coding index • Assigning data to the themes and categories in the coding box 	<ul style="list-style-type: none"> • Summarising and synthesising the range and diversity of coded data by refining initial themes • Identify Association between themes • Developing more abstract concepts 	<ul style="list-style-type: none"> • Developing associations/patterns within concepts and themes • Reflecting on the original data and analytical stages in order to ensure participants' accounts are accurately presented, thereby reducing the possibility of misinterpretation • Interpreting and explaining the concepts and themes • seeking more comprehensive application of concepts and themes

Source: Adopted from Smith & Firth(2011); Agrawal (2019, 2020)

3.10.1 DATA MANAGEMENT

Data of different documents and interview transcripts were managed through the ‘Data Management. Interviews were also written into transcripts. The qualitative data of the researcher was tabulated in MS excel. Important expressions of extremely rich descriptions from transcripts were quoted and then summarised using open codes or in-vivo codes. (Dixon-Woods, 2011; Medelyan, 2020; Ryan & Bernard, 2016; Wicks, 2017). In-vivo codes are then narrowed through the framework analysis while keeping ‘true’ to the data (Ritchie et al., 2003). Through preliminary thoughts, more formal ideas about the generated codes

were written. Categories were created based on the in-vivo codes and preliminary thoughts. So, data management initially consists of two stages

- Coding (Identification of New Codes)
- Categorisations

The data management flow is illustrated through the codes and categories matrix. The coding matrix enabled the progress to be recorded and changes to be tracked.

Transcript	Description	Preliminary Thoughts	Open Code	Initial Category
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FIGURE 3.9: DATA MANAGEMENT: FIELDS IN CODEBOOK
Source: Smith & Firth (2011)

3.10.1.1 Coding and Identification of thematic framework

Syncretic groups and open coding

Syncretic groups are the most basic preconception groupings based on vague, un-defined similarities between objects. Vygotsky identifies the syncretic group shows how the objects are grouped rather randomly (Vygotsky 1934,1986). Open coding and syncretic groups are the initial data groups that the researcher created based on the initial impression of data to fit it together coherently. Usually, qualitative researchers go through their procedures to create open codes, especially during the first examination of primary data sources (such as historical texts, audio, video, interviews etc) (Linneberg & Korsgaard, 2019; Saldana, 2008). The researcher breaks the huge amount of available data into small data units to create open codes (Strauss and Corbin, 1998).

Complexes and axial coding

Grouping objects according to complexes is the second classification of pre-conceptual thoughts. The complexes are more structured and concrete than syncretic groups. In this classification, the objects may be grouped according to the shared property, whether physical or analytical. Complexes are the most diverse form of pre-conceptual reasoning as, at this stage, attributes of objects are tied with them and cannot be separated (Vygotsky 1934,1986). Like

complexes, Axial coding involves the continual connection of different data categories that emerged from open coding. The researcher goes over the information again and clarifies the categories that are related to it by creating connections. As per Strauss and Corbin (1998), the researcher switches his attention from one item of data to the category of data.

Potential concepts and selective coding

Potential concepts are the final classification of pre-conceptual thinking. Potential concepts are the predecessor to conceptual thought. These are characterized by the measure of synthesis absent in the earlier two classifications of pre-conceptual thought. In the potential concepts, objects are grouped based on maximal similarity. A single attribute is recognized to make the group's nucleus (Vygotsky 1934,1986). Selective coding also involves the synthesis of ideas arising from original data. Maximal groups are similar to the sub-themes derived from extensive data analysis during open and axial coding. Creating the nucleus of groups is similar to the "core category" developed through merging themes (Strauss and Corbin, 1998).

From the chosen materials and interviews, a coding matrix representing distinct experiences was created. The initially created in-vivo codes represented a prospective category. These prospective categories were then combined to create larger categories. These broad groups were then successively combined to produce initial themes. Initial themes were derived, and then the data were sorted according to how generic or specific each topic was.

These categories and themes were managed and organized through 'coding indexes. Furthermore, anytime a new insight surfaced, the coding index data was continually updated through research.

Columns to form a coding index as below

Initial themes	Initial categories
----------------	--------------------

FIGURE 3.10: DATA MANAGEMENT: CATEGORIZATION IN CODEBOOK
Source: Smith & Firth (2011)

3.10.2 DESCRIPTIVE ACCOUNTS

In descriptive accounts step of framework analysis, coded data is summarised and synthesised. This summarization and syncretization of diverse coded data are performed through refining categories and themes. Critical thinking about the relationship between codes is important in the refining process. For higher reliability in research process, refining in the present study is done backwards, continual referring to and developing core concepts. (i) Continual backwards referring - Synthesising data by refining initial categories and themes until the total picture emerges. This was achieved by repeatedly comparing the meaning of the transcripts against the original data. (ii) By developing the core concept, The derived abstract concepts by identifying the critical dimensions of synthesis of information and development of concept and theme linkages (Dixon-Woods, 2011; Srivastava et al., 2009)

After developing concepts, the data were sorted according to themes, resulting in a core concept. The figure below represents the moving process of the categories and themes in a coding index. It establishes linkages between the categories and final themes from which the core concept emerged.

Initial themes	Initial categories	Redefined Categories	Final Themes	Core Concepts
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FIGURE 3.11: DERIVING CORE CONCEPTS FROM THEMES AND CATEGORIES
Source: Smith & Firth (2011)

3.10.3 EXPLANATORY ACCOUNTS

Explanatory accounts were incorporated into the original database and the analytical steps to ensure that the beliefs and experiences expressed in documents and interviews were accurately represented. This exercise reduced the possibility of misunderstanding. The core concept is usually in line with the study's objective for which documents are analysed, and interviews are conducted. The link between the fundamental concept, theoretical premise, and established literature is examined in the explanatory accounts. As a result, the linkages are detailed first, followed by the identification of typologies and an explanation of newly emerging fundamental ideas (Dixon-Woods, 2011; Srivastava et al., 2009).

3.11 RESEARCH PROCESS AND FLOW CHART

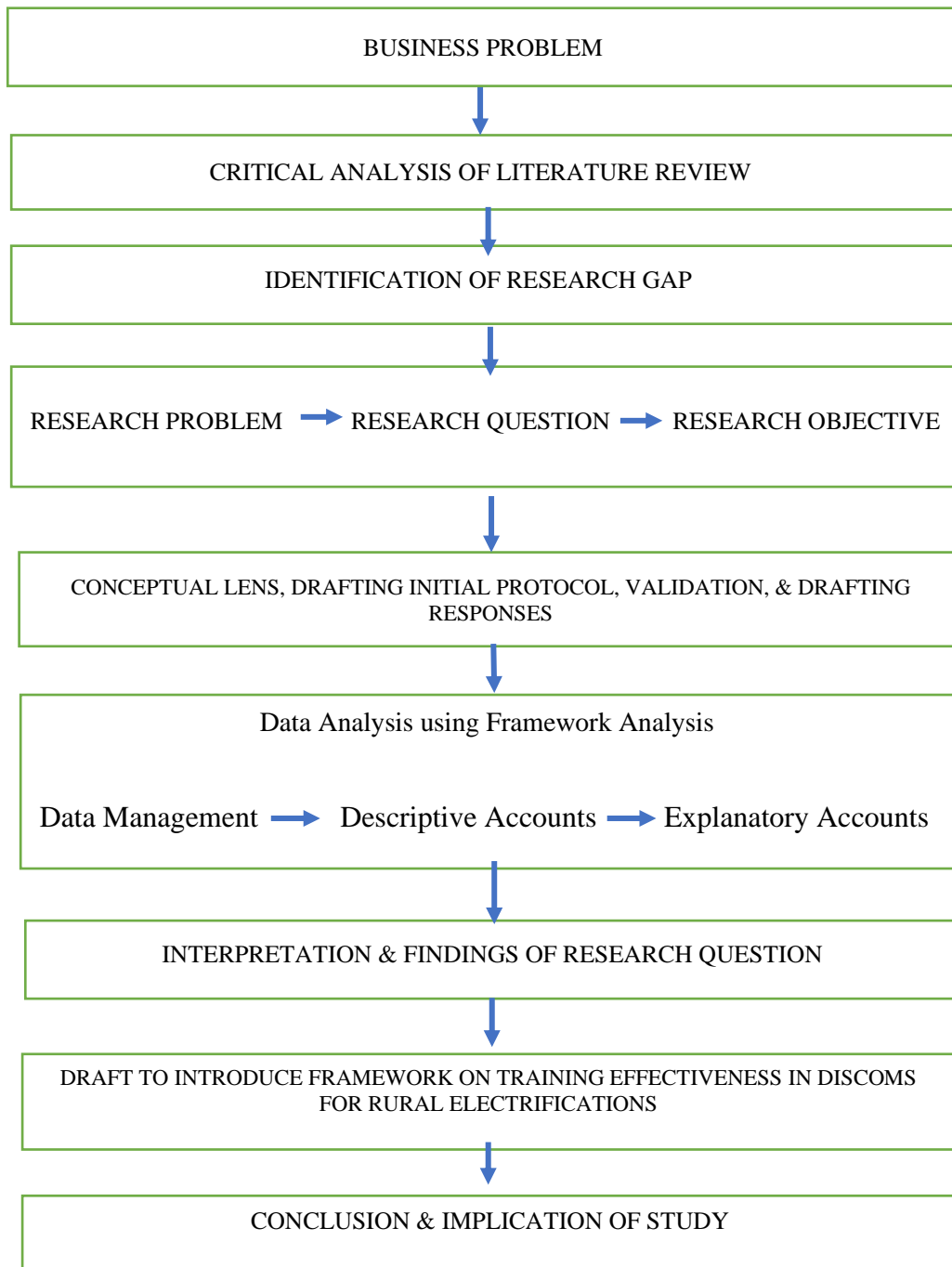


FIGURE 3.12: RESEARCH PROCESS AND FLOW CHART

3.12 SUMMARY

- Chapter three describes the researcher's research methodology to answer the research problem. The research design has considered all epistemological and ontological paradigms, and the study adopted qualitative research using Review methodology and framework analysis.
- The 343 literature reviewed in chapter two was further narrowed down through the review process to 42 documents. Finally, the selected 42 literature was validated through the MMAT tool for framing conceptual lens.
- Based on Vygotsky's (1934,1986) theory of conceptualization, conceptual lenses and conceptualized framework were prepared.
- The conceptual lens is used to form the initial interview protocol. The initial interview protocol was pilot tested with four experts, and thus validation of the initial protocol was made and finalised.
- Data were collected from a semi-structured interview with professionals, mainly from the Training and HR Department of DISCOMs and the sectorial professionals from Nodal Training Institute (RECIPMT).
- As adapted and expanded by Smith and Firth (2011), framework methodology was used to process interview transcripts through data management, descriptive accounts and explanatory accounts.
- Framework method of data reduction involved data reduction, i.e., new coding, categorization and further data management using both explanatory and descriptive accounts.
- Limitations of the study and conceptual lens biases were discussed.
- To ensure the trustworthiness of the research, the following criteria were used: dependability, confirmability, transferability, creditability, and authenticity, whereas triangulation is used to check inter-coder reliability and validity.

CHAPTER 4

QUALITATIVE ANALYSIS AND FINDINGS

This chapter outlines the demographic profile of respondents. Since the purpose of research emphasizes policy matters through qualitative research design, the sample size includes the experts in the power industry. The data is treated following the methodology taken by Smith and Firth in 2011 for framework analysis. This includes analysis in three steps. The first step is data management (reducing the data). The second step is descriptive accounts (theme identification and association building). The final step is explanatory accounts, and in this chapter, the researcher has explained the above three steps in detail. The researcher has answered the research questions in interpreting the research finding. The research questions have been further discussed in the light of relevant studies to address the research objective.

4.1 INTRODUCTION

The conceptual lens was constructed in the last chapter. After validation, the conceptualization process has helped prepare the interview protocol used for exhaustive interviews of the respondents in the sample population. The demographic profile of the respondents is presented in Table 4.1.

All the interviews were conducted in face-to-face mode. All interviews are written down and transcript. In some of the interviews, the researcher briefed back the interviewee to have increased trustworthiness.

A procedure is needed for every type of interview, and framework analysis is the best way to provide a focused and repeatable procedure for data reduction. Through the framework analysis, codes were identified on the quotations and then data was reduced by developing relevant categories and themes. Finally, these themes and categories were refined to reach the core concept.

Responses of interviews have been noted with respondents' permission manually and electronically (in excel), which is then inputted into the

computer using Computer-assisted (or aided) qualitative data analysis software (CAQDAS) - Voyant tools software (Sinclair & Rockwell, 2021). Then with the help of interview transcripts, quotations are prepared, and open codes have been generated from each interview to identify the saturation level. Once the transcripts are prepared, then the descriptive and explanatory accounts are prepared (Ritchie and Lewis, 2003; Smith and Firth, 2011)

4.2 DEMOGRAPHIC PROFILE OF RESPONDENTS

Saturation is the most important factor in deciding sample size in qualitative research (Mason, 2010). The present study includes respondents at the senior level in the power sector. The respondents' information is collected with the help of an instrument (tool) which was first validated by respondents and then used. The demographic profile of the respondents was compiled with details on their – organization, designation, domain, total experience, and expertise. The demographic profile of 22 respondents is presented in table 4.1

TABLE 4.1: DEMOGRAPHICS PROFILE OF RESPONDENT

Sl No	Years of Experience	Organisation	Role
1	Above 18	Training Faculty/Consultants	Faculties conducting training of discoms
2	Above 18	Southern Power Distribution Company of Telangana (TSSPDCL)	Training Coordinator of discoms
3	Between 9 and 18	Madhya Pradesh Poorv Kshetra Vidyut Vitaran Company (MPPKVVCL)	Nodal Training Officer of discoms
4	Between 9 and 18	Jodhpur Vidyut Vitran Nigam Limited (JdVVNL, Jodhpur)	Training Coordinator of discoms
5	Below 3	REC Ltd	Training coordinator of Govt Programmes
6	Between 9 and 18	Training Faculty/Consultants	Faculties conducting training of discoms
7	Between 9 and 18	REC Ltd	Faculties conducting training of discoms

Sl No	Years of Experience	Organisation	Role
8	Between 3 and 9	Ajmer Vidyut Vitran Nigam Ltd (AVVNL)	Training coordinator of DISCOMS
9	Between 3 and 9	Kashmir Power Distribution Corporation Limited KPDCL (JK PDD)	Training coordinator of DISCOMS
10	Above 18	REC Ltd	Nodal Training Officer of DISCOMS
11	Between 3 and 9	Southern Power Distribution Company of Telangana (TSSPDCL)	Nodal Training Officer of DISCOMS
12	Between 3 and 9	Hubli electricity supply company limited (HESCOM)	Training coordinator of DISCOMS
13	Between 3 and 9	Jammu Power Distribution Corporation Limited (JPDCL, JK PDD)	Faculties conducting training of DISCOMS
14	Between 9 and 18	The Calcutta Electric Supply Corporation (CESC)	Training coordinator of DISCOMS
15	Between 9 and 18	Kashmir Power Distribution Corporation Limited (KPDCL, JK PDD)	Faculties conducting training of DISCOMS
16	Below 3	Kerala State Electricity Board (KESB Ltd)	Training Coordinator of DISCOMS
17	Above 18	Tamil Nadu Generation and Distribution Corporation Limited (TANGEDCO)	Head of training DISCOMS
18	Between 9 and 18	REC LTD	Faculties conducting training of DISCOMS
19	above 18	North Bihar Power Distribution Company Ltd (NPDCL)	Head of training DISCOMS
20	above 18	Maharashtra State Electricity Distribution Company Limited (MSEDCL)	Faculties conducting training of DISCOMS
21	above 18	Southern Power Distribution Company of Telangana (TSSPDCL)	Training coordinator of DISCOMS
22	above 18	Himachal Pradesh State Electricity Board Ltd (HPSEB)	Training coordinator of DISCOMS

The respondents include the training coordinator of DISCOMs, head of training in DISCOMs, head of hr of DISCOMs, nodal training officer of DISCOMs, training coordinators & faculties of Government-sponsored training programmes in DISCOMs.

4.3 DATA ANALYSIS

The data analysis was done by following framework analysis as it particularly suits the cross-sectional descriptive data analysis. Framework analysis enables different aspects to be systematically captured in the analysis (Jane & Lewis, 2003, p212). The present study follows the framework analysis adopted (Arifin et al., 2019) and expanded by Smith & Firth 2011 (J. Smith & Firth, 2011). As per this approach, the analysis includes three steps –

- i) Data Management
 - a) Coding
 - b) Categorisations
- ii) Descriptive Accounts, and
- iii) Explanatory Accounts.

The mechanisms that direct the systematic data analysis are explicitly described in the connected stage of the framework analysis to develop descriptive and explanatory accounts (Smith & Firth, 2011). In order to maintain the reliability and validity of the data, the researcher has followed the method specified by Lincoln and Guba (1986).

4.3.1 DATA MANAGEMENT

The data management process includes reducing the data to be interpreted. For this, the researcher had followed Saldana (Saldana, 2008), which includes the following steps:

- i) Coding
- ii) Categorization

Also, the results of the interviews jotted down into written. Important sentences or paragraphs from extremely detailed descriptions were cited before being condensed by creating open or in-vivo codes. Table 4.2 uses a

coding matrix of codes and categories to show the direction of data management.

Interviews were also converted into written form. Important phrases of paragraphs or sentences of highly rich descriptions were put into quotations and then summarized by developing open or in-vivo codes. The flow of data management is illustrated in table 4.2 through the coding matrix of codes and categories

4.3.1.1 Coding

With the aid of a validated instrument, the researcher conducted in-depth interviews with each respondent (data collection tool). For flexible data analysis during the interviews, the framework analysis methodology was used (Arifin et al., 2019). Each interview's data is listed under "interview transcripts" from which 974 codes are created.

TABLE 4.2: DATA MANAGEMENT OF TRANSCRIPTS THROUGH CODING MATRIX

Questions	Description (in vivo code)	Preliminary Thought	Open Code	Initial Category
Over what period cost is calculated?	Period, Time, Cost, Calculated	A period in which cost is calculated	Recent 12 months, Every month, Quarterly, Bi-annual, yearly or as per requirements	Cost of benefit is calculated yearly or as per requirement
What costs are incurred during training programs?	costs, incurred, training, program	costs incurred during a training program	Online Programs, Cost of Online platform, follow-up Telephonic calls, internet charges, administrative costs for setting up the program and presence during the program for ensuring the reliable transmission of Training and maintaining discipline. Pre Covid time during face-to-face interaction, cost of travel, food and stay, marginal opportunity costs, faculty honorarium, training materials such as printed books toolkits, pendrives/ cds etc. breakfast	The cost incurred during the program includes online expenses primarily due to covid-19. This includes online programs, internet charges, the cost of an online platform, etc. At the same time, pre-covid cost includes faculty honorarium, training material, stationery, refreshments, etc.

Questions	Description (in vivo code)	Preliminary Thought	Open Code	Initial Category
			lunch, dinner tea,& snacks to participants, literature, accommodation, venue, hospitality, stationary	
How can we measure intangible costs?	Measure, Intangible, Costs	Measure Intangible cost	feedback from the officers to whom the employees report for duty after training. performance of the team member through KPI (key performance indicators) survey, feedback reports, market survey	Intangible costs can be measured using surveys, key performance indicators, feedback and market survey
What are the benefits of training in DISCOMs?	Benefits, training, DISCOMs	Benefits of training in DISCOMs	By adding value to the national economy, the person getting trained is highlighted and appreciated, "power flow" starts from generation to transmission, distribution, and end consumer. However, the cash flow starts from the end consumer to distribution,	Benefits of training in DISCOMs include: cash flow from end consumers helps DISCOMs function efficiently and sustain the power sector, refresh the knowledge, improve confidence, remove deadlocks, etc.

Questions	Description (in vivo code)	Preliminary Thought	Open Code	Initial Category
			<p>transmission, and generation. So DISCOMs must serve customers and earn money from them, and this money is injected into the power sector. Once DISCOMs function efficiently, the power sector will sustain; training programs refresh the knowledge, develop conceptual understanding, improve confidence morale, achieve desired results, remove deadlocks, and improve productivity & efficiency of employees.</p>	
<p>What are the intangible benefits of training in DISCOMs and</p>	<p>intangible, benefits, training, DISCOMs, general, power, sector</p>	<p>intangible benefits of training in discoms</p>	<p>Intangible benefits in general: 1. service quality 2. enhanced efficiency 3. customer service.</p>	<p>Intangible benefits of DISCOMs, in general, include service quality, morale, enhanced efficiency, and team building. In</p>

Questions	Description (in vivo code)	Preliminary Thought	Open Code	Initial Category
the Power Sector?			<p>Intangible benefits of training in DISCOMS for the power sector:</p> <ol style="list-style-type: none"> 1. uninterrupted power supply by optimum utilization of available and human resources. 2. Energy saved is energy produced. Hence, reducing at&c losses will reduce operating costs of generation, transmission, and distribution. In particular, reduce the consumption of coal and fossil fuels. Environmental protection & ecological balance. Sustainable development. 3. Customer satisfaction is the basic pillar for any organization and thy 	<p>contrast, intangible benefits of DISCOMs in the power sector include uninterrupted power supply by optimum utilization, energy saved and produces, customer satisfaction and fewer complaints/grievances.</p>

Questions	Description (in vivo code)	Preliminary Thought	Open Code	Initial Category
			<p>DISCOMs and power sector. In light of reforms, competition is also inevitable in the power sector. Hence, DISCOMs must drive towards customer satisfaction and move further towards customer delight to retain the customers. Morale, the confidence of employees, improved efficiency, team building, for power sector benefits include satisfied customers, fewer complaints/grievances</p>	
<p>How can we measure intangible benefits?</p>	<p>measure, intangible, benefits</p>	<p>Measure intangible benefits</p>	<p>Understanding various aspects and linkages of power systems before and after training evaluates the training benefits - Tangible and intangible/ "by measuring KPIs (SAIFI, SAIDI,</p>	<p>Intangible costs are measured by understanding various aspects and linkages of the power system, measuring KPIs, equipment failures, surveys and feedback, etc.</p>

Questions	Description (in vivo code)	Preliminary Thought	Open Code	Initial Category
			CAIFI, CAIDI...) Reduction in accidents, equipment failures, and losses. Increase in revenue collections, increased metered sales, customer feedback(surveys)"/ Carrying out surveys, public feedback,	
Over what period benefit is calculated?	period, time, benefit, calculated	A period in which benefit is calculated	Various Periods of 1 Year, 2, and 5 Years remove the abrasions, if any, but Covid has changed the scene. Computerizing the instant results can be frequent, as little as six months/ yearly/ quarterly, bi-annual, yearly etc.	The benefit of training can be calculated quarterly, bi-annually or yearly
What are the short, medium and long term benefits of training?	short, medium, long, term, benefits, training	Short, medium and long term benefits of training	A step towards affordability of power with fewer outages by making the system reliable, predictive breakdown, a resilient one, updates in technology and	Short term benefits of training are knowledge imparted to employees' team building. Medium-term benefits include skill development, efficiency

Questions	Description (in vivo code)	Preliminary Thought	Open Code	Initial Category
			<p>personal growth/ "short term: knowledge imported to employees. medium-term: skill development and efficiency improvement. long term: attitude of employees, which is a driving force for the journey towards customer delight. overall performance of the DISCOMS excellent in all parameters."/ short term - team member connections, team building, medium - knowledge upgradation, long term- improvement of team member productivity, org. reputation, development of brand image,</p>	<p>improvement and knowledge upgradation. Long term benefits include: improvement in the overall performance of DISCOMs, improvement of team member productivity, reputation and building of brand image</p>
According to you, what	Benefits, Training,	Benefits training	Rural Electrification is catering to a low-	The benefits of training in rural

Questions	Description (in vivo code)	Preliminary Thought	Open Code	Initial Category
benefits can the training framework bring in for rural electrification?	Framework, Rural, Electrification	framework can bring in for rural electrification	density population, and that too in small consumption gets lower priority in attendance of electrical faults. the training helps the local entrepreneurs handle electricity if they become certified technicians./ elevated level of knowledge, skill and attitude of employees will drive the rural electrification and thus the nation's economy./ training shall empower people to know how to implement new projects for the rural sector, adopt new technology, increase connectivity, expand the team, team building, and team strengthening.	electrification are to cater to a low-density population, get lower priority in attendance of electricity faults, elevated level of knowledge, skill and attitude of employees, expansion of the team, etc.
What are the important	important, measure,	An important measure of	The cost of having a multi-skilled	Crucial measures of ROI of training

Questions	Description (in vivo code)	Preliminary Thought	Open Code	Initial Category
measures of return on investment in Training?	return, investment, training	ROI of training	workforce vs a workforce with individuals of various disciplines, including time taken to restart the system in case of failure, can be quantified to include economic loss saved of human life saved/ KPIs/ Higher productivity levels, higher ratings of consumer feedback, DISCOM ratings	include KPIs, higher productivity levels, higher ratings of consumer feedback, etc.
How ROI methodology is helpful for training Investment of DISCOMs for Rural Electrification	ROI, methodology, training, investment, discoms, rural, electrification	The usefulness of ROI methodology for training investment for rural electrification	ROI is an important parameter, but if we start comparing the ROIs of the Urban, Industrial and Rural Electricity sectors, the results will vary. However, these are equally important for society before it takes the shape of rural vs urban protests/ in any activity, roi is an important method to decide the	Importance of ROI methodology for training investment for rural electrification by measuring both tangible and intangible benefits of training vs training investment, it is essential for employees to be upgraded to the latest technologies and work procedures to improve efficiency levels in

Questions	Description (in vivo code)	Preliminary Thought	Open Code	Initial Category
			investment. so we have to measure both tangible and intangible benefits of training vs Training Investment./ For rural network development & expansion, employees need to be upgraded to the latest technologies and work procedures so that team member is high in morale, productivity & efficiency levels is high to meet deadlines & targets	order to meet deadlines and targets
What factors impact the results of ROI?	Factors, impact, results, ROI	Factors impacting ROI result	Type of equipment on which training is to be provided, the basic knowledge level from where the training has to start and inputs provided accordingly/ method of measurement and it is accuracy/ time, technology, geographical area,	Factors that alter ROI results include the type of equipment on which training is provided, basic knowledge level, measurement method, accuracy, time, technology, etc.

Questions	Description (in vivo code)	Preliminary Thought	Open Code	Initial Category
			political scenario, management systems	
How do we isolate the effect of training?	Isolate, effect, training	Isolating the effect of training	Usually, the training gets embedded in the mind of the training. however, post training and pre training data and perceptions of individuals and their supervisors (about the workforce with them) can help/ "same employee performance before and after training. make two groups of employees, one who are trained other not trained. for the same parameter measure their performance and thus the difference."/ providing critical support systems, competent approvals, sufficient time, efficient team, technology, healthy environment etc.	To isolate the effects of training post and pre-training data is essential, and perceptions of individual & their superiors can help; also, the same parameter should be used to measure two different variables, providing necessary support systems, competent approvals, sufficient time, etc. are the isolated training effects

From each interview transcript, question-wise codes were identified till saturation; the summary of codes generated from the transcripts is presented in Table 4.3. In the table, 'Q' represents the 'question'. The number of the question appends the question (Q); For example, Q1 represents question number 1. In the table, 'R' represents the 'Respondent'. The number of respondents appends the respondent (R); for example, R1 represents respondent number 1

TABLE 4.3: CODES IDENTIFIED FROM INTERVIEW TRANSCRIPTS AND SATURATION

Question	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15	R16	R17	R18	R19	R20	R21	R22
1	5	1	2	0	0	8	2	1	1	1	0	1	0	0	2	2	2	0	0	0	0	0
2	11	4	3	0	6	3	1	2	5	5	4	4	3	2	2	5	3	0	0	0	0	0
3	7	0	3	0	2	15	4	13	0	0	0	4	1	1	14	2	0	0	0	0	0	0
4	19	4	6	3	7	12	0	6	9	7	5	12	10	3	20	4	1	0	0	0	0	0
5	11	6	4	2	6	20	2	6	15	6	2	4	2	2	15	4	4	0	0	0	0	0
6	17	8	5	2	4	9	2	3	1	4	4	3	2	2	8	4	5	0	0	0	0	0
7	2	1	3	1	4	10	0	3	2	3	0	8	0	0	3	2	4	0	0	0	0	0
8	13	7	9	4	16	4	0	6	5	0	0	8	5	2	15	10	2	0	0	0	0	0
9	16	7	8	2	4	20	6	5	2	12	7	6	4	1	14	4	2	1	0	0	0	0
10	6	6	2	2	10	8	0	12	9	4	0	7	2	0	1	1	2	0	0	0	0	0
11	12	4	2	0	2	2	0	6	1	0	4	9	2	2	5	0	2	0	1	0	0	0
12	7	0	4	2	4	6	2	6	4	0	0	6	2	5	0	0	0	0	0	0	0	0
13	3	0	12	3	2	8	1	2	0	0	0	6	2	2	4	1	0	0	0	0	0	0
Total	129	48	63	21	67	125	20	71	54	42	26	78	35	22	103	39	27	1	1	0	0	0

According to the above table following codes were identified: -

Respondent 1 (R1): 129 new codes were generated from the first respondent's interview transcript.

Respondent 2 (R2): The second respondent generated a total of 54 codes out of which 48 new codes were identified.

Respondent 3 (R3): 63 new codes were generated from the interview transcript on interviewing the third respondent from a total of 76 codes.

Respondent 4 (R4): The interview transcript led to the creation of 21 more codes, bringing the total number of codes generated from interviewing the fourth respondent to 43.

Respondent 5 (R5): When interviewing the fifth respondent, a total of 81 codes were discovered, 67 of which were derived from the interview transcript.

Respondent 6 (R6): Out of a total of 168 codes, 125 new codes were discovered from the interview transcript after speaking with the sixth respondent.

Respondent 7 (R7): After interviewing the seventh respondent, a total of 44 codes—20 new codes—were discovered in the interview transcript.

Respondent 8 (R8): Out of a total of 114 codes, 71 additional codes were discovered from the interview transcript after speaking with the eighth respondent.

Respondent 9 (R9): After interviewing the ninth respondent, a total of 94 codes—54 new codes—were created from the interview transcript.

Respondent 10 (R10): From a total of 80 codes, 42 new codes were created from the interview transcript after speaking with the tenth respondent.

Respondent 11 (R11): After interviewing the eleventh respondent, 26 additional codes—out of a total of 89—were created from the interview transcript.

Respondent 12 (R12): Out of a total of 120 codes, 78 new codes were created from the interview transcript when the twelfth respondent was interviewed.

Respondent 13 (R13): After interviewing the thirteenth respondent, a total of 56 codes—35 new codes—were created from the interview transcript.

Respondent 14 (R14): From a total of 35 codes, 22 new codes were generated from the interview transcript when the fourteenth respondent was interviewed.

Respondent 15 (R15): From 154 codes, 103 new codes were generated when the fifteenth respondent was interviewed.

Respondent 16 (R16): After interviewing the sixteenth respondent, a total of 84 codes—39 new codes—were created from the interview transcript.

Respondent 17 (R17): After interviewing the seventeenth respondent, a total of 74 codes—27 new codes—were created from the interview transcript.

Respondent 18 (R18): 1 new code was generated from the interview transcript on interviewing the eighteenth respondent from a total of 44 codes.

Respondent 19 (R19): 1 new code were generated from the interview transcript on interviewing the nineteenth respondent from a total of 63 codes.

Respondent 20 (R20): No new codes were generated from the interview transcript on interviewing the 20th respondent from a total of 68 codes.

Respondent 21 (R21): No new codes were generated from the interview transcript on interviewing the 21st respondent from a total of 69 codes.

Respondent 22 (R22): On interviewing the twentieth respondent, total codes found to be 71 but no new code was generated from the interview transcript, suggesting the saturation in data.

With further probing it transpires saturation with full understanding of the participant's perspective is reached and no new analytical insight is forthcoming (Jane & Lewis, 2003). Thus, the sample size for the study was 22.

The question wise code generation was summarised as below (detailed in annexure A3.3)

Question 1: From 22 respondents 28 codes were generated for the first question.

Question 2: From 22 respondents 63 codes were generated for the second question.

Question 3: From 22 respondents 66 codes were generated for the third question.

Question 4: From 22 respondents 128 codes were generated for the fourth question.

Question 5: From 22 respondents 111 codes were generated for the fifth question.

Question 6: From 22 respondents 83 codes were generated for the sixth question.

Question 7: From 22 respondents 46 codes were generated for the seventh question.

Question 8: From 22 respondents 106 codes were generated for the eighth question.

Question 9: From 22 respondents 121 codes were generated for the ninth question.

Question 10: From 22 respondents 72 codes were generated for the tenth question.

Question 11: From 22 respondents 54 codes were generated for the eleventh question.

Question 12: From 22 respondents 48 codes were generated for the twelfth question.

Question 13: From 22 respondents 46 codes were generated for the thirteenth question.

4.3.1.2 Categorisation

The categorisation narrows wide data under its category giving one structure to the data (Arifin et al., 2019 & Jane & Lewis, 2003).

Through the Data management (Code Book Appendix A3.2), 974 open codes were identified. The codes were generated by analysing each line of the text of the transcript. Researchers' initial thoughts were used to summarise the codes produced for each interview topic. These thoughts generated more formal ideas about the codes and individual quotations. Open codes and preliminary thoughts are advocated in the formation of 13 'initial categories' (A3.3)

4.3.2 DESCRIPTIVE ACCOUNTS

Descriptive account identifies key dimensions of the data and maps the range and diversity. It considers that the actual words used by respondents' substantive content are captured by descriptive coverage, and meaning is assigned, forming the core qualitative evidence (Arifin et al., 2019 & Jane & Lewis, 2003). Thus, Descriptive accounts are used to summarise and synthesise coded data. Refining categories and themes is done in order to synthesise and summarise various coded data. Analyzing the connections between codes critically is crucial in the refining process. Refining in the present study for reliability. Refining in the present study for reliability is done

backwards, continual referring to and developing core concepts (Arifin et al., 2019; Jane & Lewis, 2003).

- i) Continual backward referring - The synthesised data by refining basic topics and categories until the complete image emerges. This was accomplished by continually referring back to the original data and checking meaning across the transcripts.
- ii) The important characteristics of the synthesised data were identified, and links between concepts were built to create the abstract notions. and themes. After developing abstract concepts, the data were sorted according to the finest sequence of themes, resulting in a core concept.

13 initial categories led to 11 refined categories, which led to the development of 9 initial themes and then 7 final themes from which four concepts emerged. The datil of the codebook was discussed in Annexure A3.3

TABLE 4.4: DESCRIPTIVE ACCOUNTS OF THE DATA

Initial category	Refined Category	Initial Theme	Final Theme	Concept
Cost of benefit is calculated yearly or as per requirement	Period to calculate the cost of benefit as per requirement	Period to calculate the benefit of training	Benefits of training in DISCOMs	Benefit of training
The cost incurred during the program includes online expenses primarily due to covid-19; this includes online programs, internet charges, the cost of the online platform, etc. Whereas pre covid cost includes: faculty honorarium, training material, Stationary, Refreshments, etc.	Cost of training during program pre and post covid measured	Cost of training during program pre and post covid	Cost of training during the program	Cost of training
Intangible costs can be measured using surveys, Key performance indicators, Feedback and market survey	Means to measure intangible costs incurred during training	Intangible cost of training measured	Intangible cost of training measured	Cost of training

Initial category	Refined Category	Initial Theme	Final Theme	Concept
Benefits of training in DISCOMs include: Cash flow from end consumers helps DISCOMs function efficiently and sustain the power sector, refresh the knowledge, improves confidence, removes deadlocks, etc	Benefits of training in DISCOMs in general and in the power sector	Benefits of training in DISCOMs in general and in the power sector	Benefits of training in DISCOMs	Benefit of training
Intangible benefits of DISCOMs, in general, include service quality, morale, enhanced efficiency, and team building. In contrast, intangible benefits of DISCOMs in the power sector include uninterrupted power supply by optimum utilization, energy saved and produced, customer	Benefits of training in DISCOMs in general and in the power sector	Benefits of training in DISCOMs in general and in the power sector	Benefits of training in DISCOMs	Benefit of training

Initial category	Refined Category	Initial Theme	Final Theme	Concept
satisfaction and fewer complaints/grievances.				
Intangible costs are measured by understanding various aspects and linkages of the power system, measuring KPIs, by equipment failures, carrying out surveys and feedback, etc	Various aspects measure intangible costs	Intangible cost of training measured	Intangible cost of training measured	Cost of training
The benefit of training can be calculated quarterly, bi-annually or yearly	Period to calculate the cost of benefit as per requirement	Period to calculate the benefit of training	Benefits of training in DISCOMs	Benefit of training
Short-term benefits of training are knowledge imparted to employees' team building. Medium-term benefits include skill development, efficiency improvement and	Benefits of training measured in different periods of timespan	Benefits of training over a different period	Benefits of training in DISCOMs	Benefit of training

Initial category	Refined Category	Initial Theme	Final Theme	Concept
<p>knowledge upgradation. Long term benefits include: improvement in the overall performance of DISCOMs, improvement of employee productivity, reputation and building of brand image</p>				
<p>The benefits of training in rural electrification are to cater to a low-density population, get lower priority in attendance of electricity faults, elevated level of knowledge, skill and attitude of employees, expansion of the team, etc.</p>	<p>Benefits of training in rural electrification</p>	<p>Benefits of training in rural electrification</p>	<p>Benefits of training in rural electrification</p>	<p>Benefit of training</p>
<p>Crucial measures of ROI of training include KPIs, higher</p>	<p>Important measures of</p>	<p>Necessary measures of</p>	<p>Important measures of</p>	<p>ROI methodology</p>

Initial category	Refined Category	Initial Theme	Final Theme	Concept
productivity levels, higher ratings of consumer feedback, etc.	ROI of training	ROI of training	ROI of training	
Importance of ROI methodology for training investment for rural electrification by measuring both tangible and intangible benefits of training vs training investment, it is important for employees to be upgraded to the latest technologies and work procedures to improve efficiency levels in order to meet deadlines and targets	Necessary measures of ROI of training	Important measures of ROI of training	Necessary measures of ROI of training	ROI methodology
Factors that alter ROI results include the type of equipment on which training is provided, basic knowledge	Factors that affect ROI result	Factors affecting the result of ROI methodology	Factors affecting ROI methodology	ROI methodology

Initial category	Refined Category	Initial Theme	Final Theme	Concept
level, measurement method, accuracy, time, technology, etc.				
To isolate the effects of training post and pre-training data is essential, and perceptions of individual & their superiors can help; also, the same parameter should be used to measure two different variables, providing necessary support systems, competent approvals, sufficient time, etc. are the isolated training effects	Isolate the effects of training post and pre-training data is important	Isolate effect of training-post and pre-training	Effects isolated from training	Effectiveness of training

4.3.3 EXPLANATORY ACCOUNTS

The researcher examined the original database and the analytical stages of the study to determine whether the beliefs and experiences were accurately represented in the explanatory accounts. Explanatory accounts led to the formation of the core concept. Four final themes were identified in descriptive accounts which ultimately formed two core concepts, 'ROI methodology and training effectiveness. Codebook (Annexure A3.2) may be referred to as the core concept's formulation.

The explanatory accounts of the framework analysis involved understanding of the various concepts, categories and themes that emerged. This was accomplished through exploring the relationship between core concepts, established literature and theoretical premise related to the ROI of the training framework of DISCOMs for rural electrification trainings. This was done with data visualisation through collocates Graph of voyant tools representing keywords and terms that occur in close proximity as a force directed network graph. Once the relationships were described and concepts identified, typologies emerged to explain the working of various concepts. The explanation of such typologies and concepts is presented through findings and discussion later in this chapter.

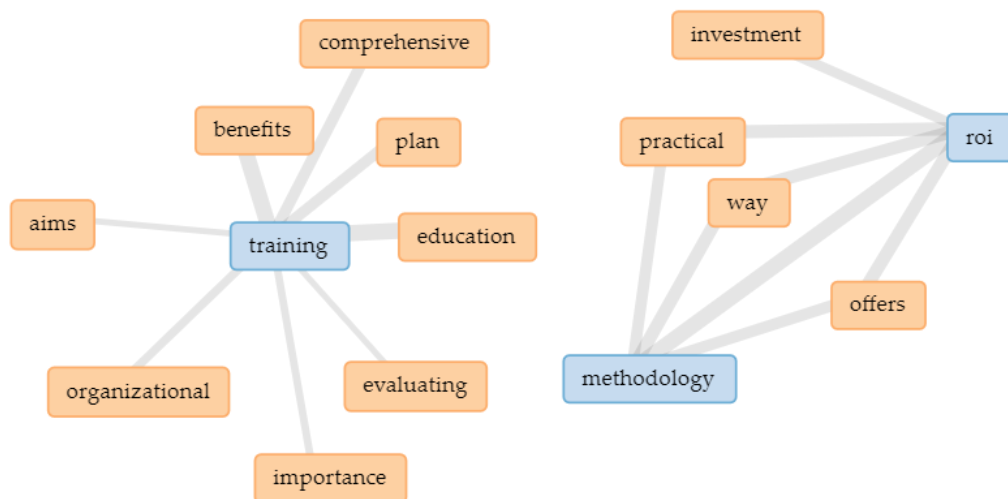


FIGURE 4.1: RELATIONSHIP 1 USING THE FUTTERMAN REINGOLD LAYOUT ALGORITHM

Figure 4.1 visualises the keyword and terms that occur in close proximity depicting an association between *training* with benefits, comprehensive plan, evaluation, organisation indicating importance of training to organisation and importance of evaluation of training. *Methodology* is linked to *ROI* (Return on Investment) with practical ways and offers, and investment is associated with ROI, which indicates that ROI methodology is the practical way to measure investment.

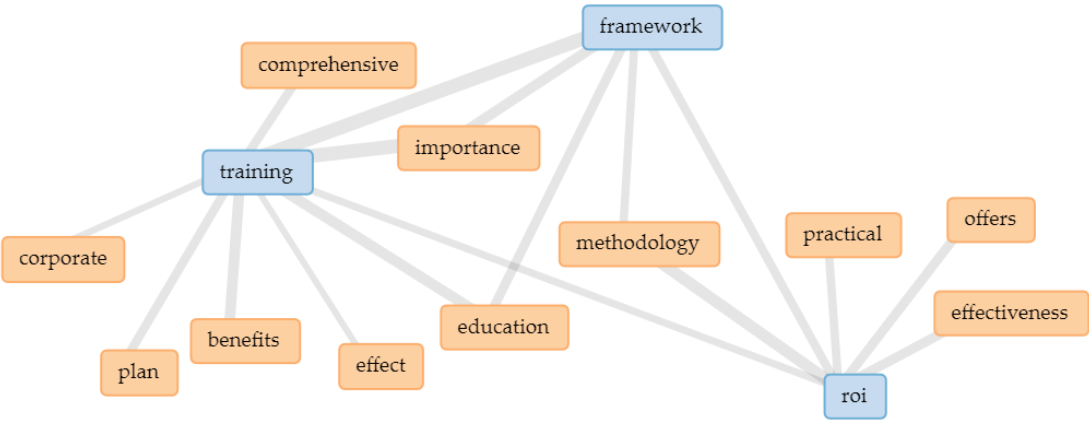


FIGURE 4.2: RELATIONSHIP 2 USING THE FUTTERMAN REINGOLD LAYOUT ALGORITHM

The above figure is collocates graph output of Voyant tools and shows a network graph of *training*, *framework* and *ROI* with comprehensive, importance, benefits, methodology, practical, effectiveness etc. Training is linked with a framework through education and importance, whereas the framework is linked with ROI through methodology and ROI is linked to effectiveness and reasonable offers.

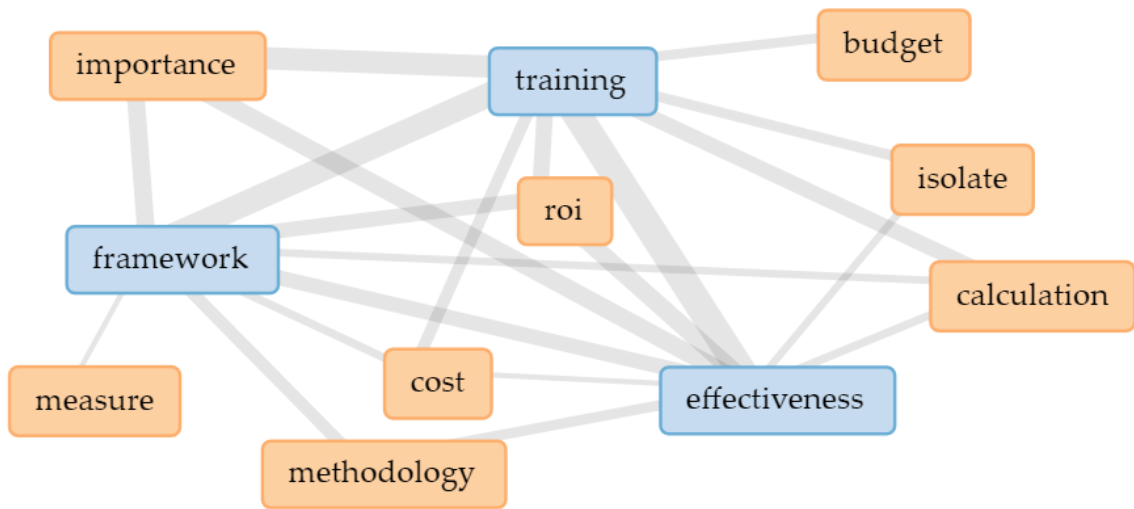


FIGURE 4.3: RELATIONSHIP 3 USING THE FUTTERMAN REINGOLD LAYOUT ALGORITHM

The above figure shows a link of *framework*, *training* and *effectiveness* with importance, measure, methodology, cost, ROI (Return on Investment), budget, isolate, and calculations. The framework is linked with importance, measure, methodology, cost and ROI (Return on Investment). Further Training is also linked with effectiveness, which is linked with cost, ROI and methodology for training, suggesting that the training effectiveness framework should include the measures, methodology, budget calculation, return on investment as a holistic view rather than operating in isolation. This is further highlighted by linking of effectiveness and training with “isolating”.

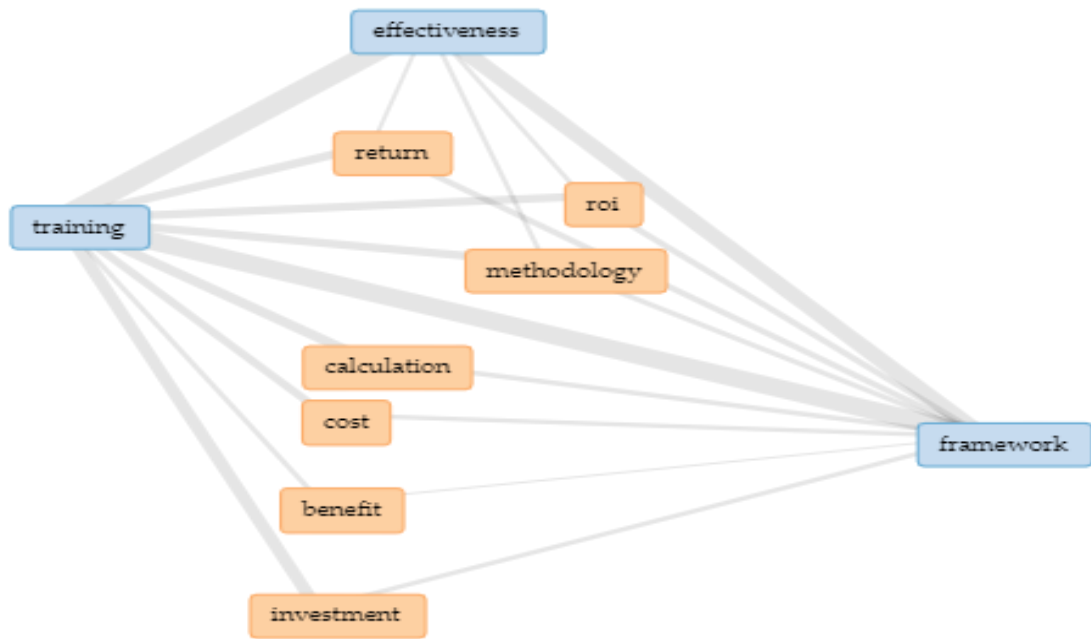


FIGURE 4.4: RELATIONSHIP 4 USING THE FUTTERMAN REINGOLD LAYOUT ALGORITHM

Figure 4.4 shows that *training*, *effectiveness* and *framework* are found interwind and commonly connected with return with investment in terms of cost and benefit calculations, the investment on training. The tri-link between training, framework and effectiveness shows common connectivity and emphasises methodology on the training effectiveness and return on investment.

4.4 FINDINGS ON RESEARCH QUESTIONS

The detail of the data reduction, categorisation, and concept generation during the analysis for ease of understanding and clarity of presentation are presented separately in Appendix A3.2.

Refined Theme: Initially, on the complete interview transcripts, 49 categories were identified and refined into ten (10) broader Categories. Consecutively, these categories were brought together to form themes and 4 Concepts. They formed the core concept ‘The framework for ROI of rural electrification trainings of DISCOMs’. Based on the research questions framework, the questions mentioned below were identified. A brief discussion on each review question is:

Review Questions: a) *Is there a need to measure the return of investment in training? Will it increase the effectiveness of rural electrification training?*

Findings: The analysis of responses concludes that Training in DISCOMs improves productivity, reliability, department, and activities by showing how it contributes to its objectives and goals. Training requires time, money and resources. Measures of return on investment include increased skills, increased annual revenue, reduction of accidents, improvement in revenue and administrative cost and improvement in power quality. ROI is useful in the training of rural electrification of DISCOM as it means the total investment is divided by the annual savings, which is expressed in years. Further, the trainees are gaining new knowledge and skills to increase efficiency or reduce costs at the workplace. The ROI methodology is the systematic approach to ROI evaluation. The ROI methodology has sustained its position as the leading approach to program evaluation as methodology offers a balanced set of precise measures methods. It helps contribute to the value addition of training programmes, narrow down the less beneficial programmes and encourage more investment in more effective training programmes.

Review Questions: b) *Is it possible to measure the cost of training (tangible and intangible), the benefit of training (tangible and intangible), and the measurement time to capture the same?*

Findings: The cost of training is to be calculated every financial year, cost of training expenditure in DISCOMs is to be calculated for a year. According to experts, period cost calculations are based on estimates made. The cost of training is calculated every year. It should be after every month, and a few suggestions that it be calculated every month. The cost incurred during the training programmes mainly includes delivery cost by resource person, administrative cost including the arrangement of resources like a classroom, food etc. It also includes reimbursement of expenses incurred by employees during training. An intangible cost is a cost that can be identified but cannot be qualified or easily estimated. However, some experts also suggest that test results and away time from a regular job (for those who are sent for training) f has intangible

cost implication which is easy to measure compared to the tangible cost involved in losing an employee's day of work (for those who are sent for training), travelling, boarding and lodging and training material that cannot be reused in some other training program.

Review Questions: *c) How to isolate the effect of the factors affecting training effectiveness for measuring ROI and ways to isolate training effects?*

Findings: Refreshment courses may be included to isolate the ROI's effects for practical training. The effectiveness of the training can be more seen for roles having less transfer or job rotation. Expertise says that “it may happen that the department will not get as much money next year if we do not present some evidence that we are having a positive effect on desired goals about respective training”. The ROI helps find whether the training programme was effective and concludes the programme's modification, continuance or discontinuance.

Review Questions: *d) To define the benefits ROI-based training framework brings for rural electrification in DISCOMs and to acknowledge short, medium- and long-term benefits of training towards a decision of investment towards team member training, if applicable.*

Findings: Determining a reasonable rate for improved performance allows calculating savings and identifying changes in behaviour and attitude. The benefit for technical areas stays up to 10 years before its benefit diminishes on transfer or job rotation of the team member. Total anticipated savings can be calculated by dividing the amount of savings by the number of trainees participating in the program. Reduced breakdowns and reduced customer complaints are also an indicator of intangible benefits. According to industry experts, the benefits can be calculated over three or five years. Short-term benefits include increased belief, Improvement in working and knowledge addition. Medium-term benefits include increased performance, better coordination among staff and conflict management. Lastly, long-term benefits include feeling fulfilled, becoming a leader and influencing others both in the workplace and outside. Specifically, rural electrification can increase the organisation's reputation to pour more funds into the Government. The analysis

of responses concludes that Training in DISCOMs improves productivity, reliability, department, and activities by showing how it contributes to its objectives and goals. ROI depends on trainees at centres gaining new knowledge and skills to increase efficiency at the workplace and measure the cost of this training against the benefits to both individuals.

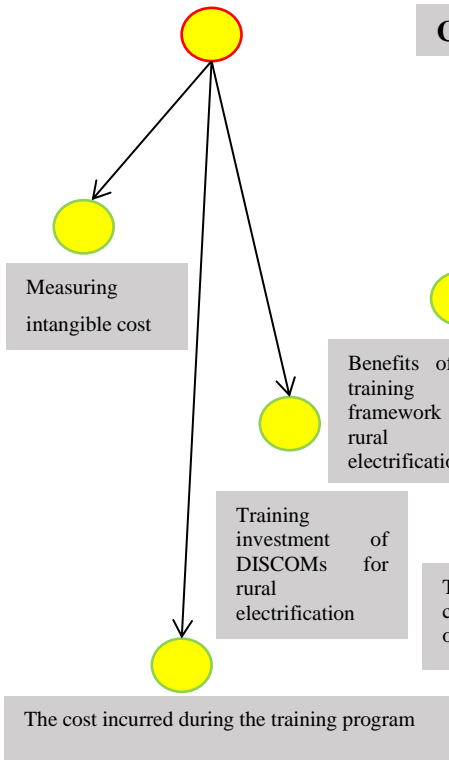
The research question of the study was “*What should be the framework for ROI of rural electrification trainings of DISCOMs?*”

The framework is presented in figure 4.5. The finding of the research was made based on the identification of categories. Identification of themes and categories led to the formation of the core concept. Finally, the concepts were interpreted in the form of a framework. The summary of findings is shown on the next page. The findings answer the research questions, and the theoretical aspects of the findings and other findings were also listed.

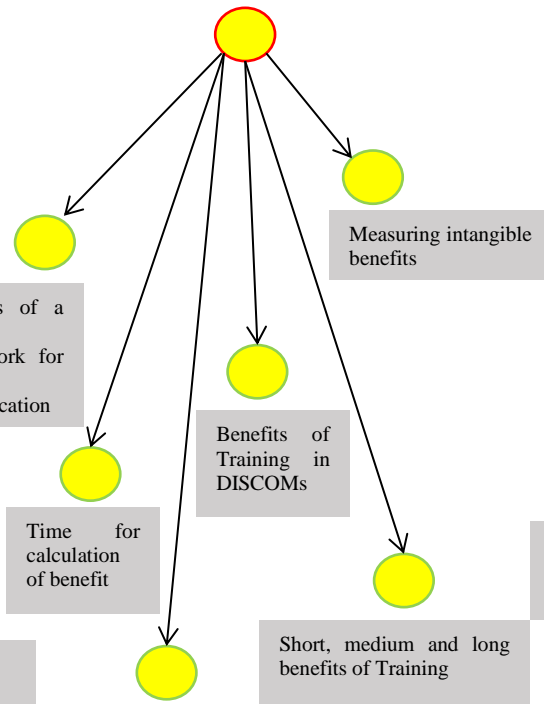
The proposed framework consists of key concepts, i.e., Calculation of Cost of Training, Calculation of Benefits of Training, ROI Methodology, and Effectiveness of Training.

SUMMARY OF FINDINGS

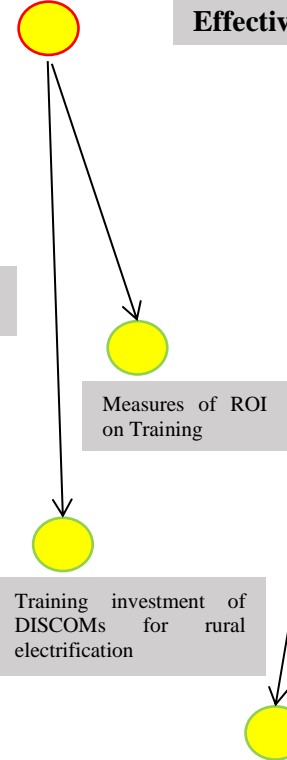
Calculation of Cost of Training



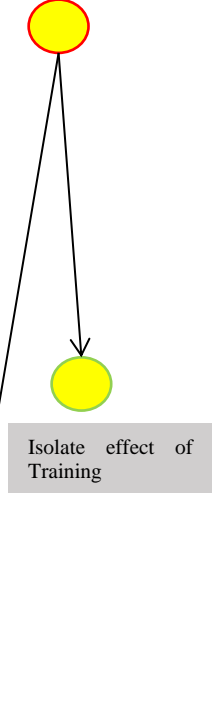
Calculation of Benefits of Training



ROI Methodology



Effectiveness of Training



Calculation of Cost of Training		
The time for calculation of cost	The cost incurred during the training program	Measuring intangible cost
Calculation of Benefits of Training		
Benefits of Training in DISCOMs	Intangible benefits of training in DISCOMs in general and for the power sector	Measuring intangible benefits
Time for calculation of benefit	Short, medium and long benefits of training	Benefits of a training framework for rural electrification
ROI Methodology		
Measures of ROI on training	Training investment of DISCOMs for rural electrification	
Effectiveness of Training		
Factors that impact the result of ROI	Isolate effect of training	

FIGURE 4.5: SUMMARY OF FINDINGS ON PROPOSED FRAMEWORK FOR ROI OF RURAL ELECTRIFICATION TRAININGS OF DISCOMS.

Findings on Calculation of Cost of Training: The training cost in Rural Electrification training in DISCOMs involved Faculty Honourarium (Remunerations), Training Materials such as printed books, tool kits, stationary, pendrives/ cds etc, breakfast lunch, dinner tea, & snacks to participants, telephonic calls, internet charges, administrative costs for setting up the program and presence during the program. Travel of faculty and participants, Accommodation, Venue cost including teaching aids Calculation of training cost has three main themes in the interview protocol. The tangible cost incurred for travel, accommodation, training material, field visit, etc., are easily measured. The respondents suggested that intangibles costs which are relatively difficult to quantify is to be first identified and then best estimate to be taken using feedback, surveys, and reports. After studying and analysing various responses, it is concluded that calculating the cost of training in DISCOMs could take one month to a year, depending on the nature program. The cost incurred during the training program was according to the number of employees and the firm's size.

Findings on Calculation of Benefits of Training: All respondents agreed that the training programme benefits DISCOMs. The benefits of training in DISCOMs include development of knowledge, skill development, develops conceptual understanding, improved confidence, morale, improved performance, improved productivity, improved communication and teamwork, improved customer satisfaction and reduction in complaints, reduced conflicts and stress, reduced accidents and increased safety, overall productivity improvement and increased revenue. As four participants suggested, these benefits significantly improve the DISCOM's financial health, develop institutional capabilities in providing affordable power to rural areas, and strengthen some of the benefits of training are intangible such as a change in attitude, change in the way of thinking and development of positive mindsets and suggested to estimate the results through feedbacks. The analysis of responses concludes that measure intangible benefits, a closer estimation is to be taken, and it requires a structured approach with basic but essential concepts, such as informed guesses, use of samples to test the validity of estimates, and measuring KPIs (Key Performance Indicators). The intangible benefits can be

captured in terms of DISCOM's Financial results, customer service indices, and the number of fewer accidents. The time duration for calculating such benefits varies depending on the program. It can either take one month or even five years, depending on the nature of the programme. The benefits of technical training are for a few specific roles and sometimes diminishes if the job rotation of employees is made. However, the non-technical skill, precisely soft skills, are not role-specific, and the benefit goes for more than five years, as expressed by experts. Thus, the period of benefits training can be short, medium and long-term depending on the nature of the training programme. The long-term benefits of training for Rural Electrification in DISCOMs are enhanced skill and performance towards increased customer Focus, reduced distribution Loss, and Overall Improvement in DISCOMs, which is reflected in sustainable, reliable and affordable rural supply.

Findings on ROI Methodology

The response shows that training ROI will be important for comparing various training programmes in DISCOMS. DISCOMs will invest in training programmes with more ROI. DISCOMs can use ROI to improve the training programmes with high importance but low ROI. As the responses clearly show ROI framework will be helpful in DISCOMS to calculate the ROI of the training programme. The ROI method of collection of data and analysing data requires quantifiable data and a specific time frame for capturing data. The cost of training has more tangible data than benefits, the respondents suggested for estimation of the intangible data. The idea of DISCOMs components of training, including complex data organisational results such as time savings, cost savings, quality improvement etc. and soft data like work culture, work climate, team member development etc., is essential to gather data related to ROI. The analysis of the responses also shows that ROI on Training depends on the number of employees in training, reduced maintenance cost, money, resources, etc. All participants have highlighted the benefit of measuring ROI for training in DISCOMs leads to employees upgrading to the latest technologies and work procedures to improve customer satisfaction, the challenge of power shortage,

and improved rural distribution infrastructure for affordable and sustainable power.

Findings on Effectiveness of Training

The effectiveness of training included factors that impact the result of ROI, which varies over the time frame of data collection, accuracy in capturing the hard and soft data for benefits, nature of the training programme, employee turnover etc. The respondents shared that the ROI differs over time, training factors and modules, technology, geographical area, political scenario, management systems etc. Some of the benefits of the Training may accrue over a period of time. Thus, the process must balance maintaining a practical and sensible approach and a sound theoretical base for the procedure. All cost components relating to training affect the ROI; thus framework in DISCOMs focuses on capturing costs more accurately especially converting intangible costs with feedback, surveys, and reports. Isolating the effect of Training is a difficult task. Still, as per a few professionals, the control group can work on the trained employee's performance linked to KPI with trend line analysis. Some experts suggest estimating team member performance (the expert may be the manager or leader of the employee) or obtaining information directly from the programme participants, and his 360-degree feedback from the boss, peers, and subordinates will be more accurate.

4.5 DISCUSSIONS ON RESEARCH OBJECTIVE

The research objective of the study is “*To formulate the framework for ROI of rural electrification trainings of DISCOMs*”.

This study's findings show the connection between the training cost, benefit, and period of measurement and with ROI of the training. This research details the investment made in training, involving a training effectiveness framework inclusive of the return on the Investments. Subramaniam et al. (2012) have advocated that ROI help evaluate the training and realise how much training has boosted the bottom line helping management understand that training is an investment and not an expense (Subramanian et al., 2012). The researcher is now presenting discussions on the findings in line with the research objective, ‘*To formulate the framework for ROI of Rural Electrification Trainings of DISCOMs discussing the formulation of various sections under RoI framework*’.

Calculation of Cost of Training

The calculating training cost is one of the main components of the framework. It concerns the resources and opportunities sacrificed to take the training along with the value, benefit, or utility it provides. The ROI framework of rural electrification training of DISCOMs needs to capture both tangible (for travel, accommodation, training material, field visits, etc.) and intangible (such as cost of employee kept away from work, training course maintenance and updation cost). Stolovitch & Maurice had mentioned the same components of training cost under training development cost, training implementation cost and training maintenance cost (Stolovitch & Maurice, 2007). The cost incurred during the training program was according to the number of employees and the firm's size. The duration of the cost measurement may vary depending on the nature of the training programme. The training course maintenance and updation require variable time. Moreover, it does not consider the inflation cost (Fletcher, 2014; Tharenou et al., 2007). The DISCOMS need to have its training policy, training

budget and training centre to capture all the cost-related data of the organisation and focus on reducing the cost of training, which will increase the ROI.

Calculation of Benefit of Training

The Training in DISCOMs improves productivity, reliability and quality of supply, safety practices, and employee positivity, leading to improved performance towards the reliability of power and outages, reduced cost, etc. However, most training benefits such as attitudes, motivation, and employee morale are intangible and difficult to quantify, as mentioned in various studies (Fletcher, 2014; Percival et al., 2013; Tharenou et al., 2007). This research findings for the ROI framework for rural electrification training of DISCOMs suggest a structured approach with informed guesses, use of samples to test the validity of estimates, measure KPIs (Key Performance Indicators) and using as an estimate to measure various benefits of the training. Jasson and Govendar, (2017) and Lynch et al. (2006) followed a similar approach of estimates to convert intangible benefits. These findings for measuring the benefit of training in DISCOMs were found to be varying with the time frame taken to measure the benefit, which varies from zero to five years depending on the nature of the programme. Thus the framework highlights the period of measuring the benefit in the DISCOMs.

Measures for Return of Investment in ROI Framework

Return on investment methodology measures the cost and benefits of training investment of DISCOMs and for training programmes in rural electrification. Highlight soft and hard data collection focusing on tangible and intangible costs and analysing data within a specific time frame. It connects training over and above the HR outcome or organisational results to the financial results (Tharenou et al., 2007). It explores the ROI methodology and finds that the period used to calculate the cost and benefit of training is one of the most important factors influencing ROI results. Because the benefits of training can last for a short time, a medium time or even a lifetime for particular behavioural skill training, the training investment in Rural electrification can be compared in terms of the ROI to choose the best training programme to invest in or choose

to identify causes for low ROI of training programmes leading to improvement in the effectiveness of training.

Moreover, this will put training as per other business activities rather than an employee welfare measure (Tyagi & Vishwakarma, 2017). The ROI-based training framework suggests more effective use of the training budget towards employee skill development for organisational results in reducing AT&C losses, O&M costs, energy conservation, etc. For rural electrification, the ROI framework helps assess the increase of employees' efficiency and morale, leading to higher productivity to meet organisational goals. In addition, it helps measure ROI and invest in more effective rural electrification training programmes for enhanced employee skills for better customer service, reliability, and quality of distribution network.

Effectiveness of training

Martocchio and Baldwin's (1997) suggested that training effectiveness may be measured at the individual and HR level, organisational level and further as financial results. The ROI framework considers quantifiable effectiveness rather than subjective (Stolovitch & Maurice, 2007). The factors that affect training, such as selection of training and systematic training effort in the organisations, considerably affect the ROI (Ghosh et al., 2011; Ibrahim, 2004; Swanson & Sleezer, 1987). The factors such as training programme, course material, training environment etc., have also impacted training effectiveness, and the framework proposes to consider the factors of the training and time frame of data collection, capturing the hard and soft data. Many researchers have similar findings that the training outcome and thus ROI of training differs over time, training factors and modules, technology, geographical area, political scenario, management systems etc. (Barnett & Mattox, 2010; Paul & Tyagi, 2022; Vincent Rubino, 2021).

This exploratory study on findings of the framework in DISCOMs adds to the existing ROI framework for training effectiveness on ROI by Phillips (1991, 1994, 1996) by covering intangible costs, benefits and factors of training affecting both. This research reveals that factors of training effectiveness which

are intangible (such as motivation, attitude, emotional intelligence, support from management and peers, training style and environment, the open-mindedness of the trainer, job-related factors, self-efficacy, and essential ability, among others), have an impact on training ROI and should be directly mapped in the existing training ROI framework.

Many firms have implemented measuring the ROI of training departments thanks to Kirkpatrick's (1994, 1996) popular framework and an updated model afterwards contributed by Phillips (1991, 1994, 1996). The Kirkpatrick/Phillips ROI model, which was employed, is stated to be imprecise. However, it provides a framework for tracking training reactions, team member behaviour changes resulting from the training, and financial accountability for the training investment.

The research findings are helpful for policy recommendations in federally supported rural electrification programmes. Rural electrification policies included elements of capacity building. The Government of India has approved a budgeted commitment of Rs 1500 million for the national training programme in the policy statement 2012-17 of RGGVY (subsumed in DDUGJY in 2015). (NTP). DISCOMs are the retailer, and for over 50 years, DISCOMs have been the main point of rural electrification efforts, with all money going towards adding assets or building institutional skills at DISCOMs. According to my research, DISCOMs may aim to establish an ROI-based effectiveness framework for training programmes by utilising the capacity-building components of rural electrification schemes. This will have a more significant impact on DISCOMs' rural electrification training. DISCOMs may also use the framework for their self-funded training.

This study broadens DISCOM management's understanding of training and capacity-building techniques. This research adds to and fills a gap in the literature on training ROI. Furthermore, this study establishes a framework for measuring ROI. The management of various DISCOMs must take the lead in effectively implementing the ROI-based effectiveness framework for rural

electrification training. The same will result in strategic training policies and a data-centric culture in organisations to ensure that soft and hard data on the skill is readily available. My research reveals that DISCOMs' ability to address various challenges and reformative measures, such as financial turnaround of DISCOMs, resilience and customer-centric approach etc., is enhanced by skilled resources. Therefore, the effectiveness of training using an ROI-based training framework will help DISCOMs select its more valuable training programme to invest in. Furthermore, the ROI-based training framework will assist DISCOMs in being more effective in their RE training programme, bridging skill gaps and boosting institutional capacity, leading to saving in DISCOMs

The existing training policy and practice of DISCOMs training do not have any framework for calculating training ROI. The centrally funded training pieces under rural electrification do not envisage any ROI measurement for the training programme conducted by DISCOMs. The literature suggests that any work on the main framework for ROI of rural electrification training of DISCOMs will be helpful for rural electrification will be helpful in DISCOMs enhancing skill, knowledge and ability of its workforce towards meeting challenges of rural electrification in India. This further will ensure effective utilisation of the training budget for rural electrification towards building human resource capabilities for providing reliable, affordable and sustainable power to all.

4.6 FRAMEWORK TRANSFER SCHEME DRAFT

DISCOMs are the retailer of electricity in the Indian power sector. They are at the centre of all the efforts of MoP and GoI toward ensuring affordable, reliable and sustainable power. In the last three decades, many government schemes with significant financial outlay aimed at building the institutional capabilities of DISCOMs, DISCOMs reforms, and improving DISCOM's financial health. However, the DISCOMs continuously make losses and have problems paying for their power purchase. The borrowing of DISCOMs is ₹5,14,237 crore as of March 31, 2020, which is 2.3% of nominal GDP (PFC Ltd, 2021). As a result of this poor financial health, they cannot ensure the quality of the power supply and greater use of renewable energy. With such constraints on finance, DISCOMs

could neither focus on augmenting its aged distribution infrastructure nor invest much in the Training & development of its human resource. Therefore, many DISCOMS do not have any training policy (and thus budget) for their workforce training (NITI Ayog, 2021; The Rockefeller Foundation & Niti Aayog, 2020). Most training is part of Centrally funded schemes such as DDUGJY, IPDS, USAID, Skill training of PSSC etc. DISCOMs will get benefited from incorporating the proposed framework into its training policy. Further, any guideline of centrally funded schemes promoting the adoption of the proposed framework in DISCOMs will ensure the effectiveness of rural electrification training and even other upcoming DISCOMs modernisation schemes for improving affordable, reliable and sustainable power such as RDS.

The researcher has searched for the training policy of all 41 DISCOMs on the website and available literature and contacted the HR (Human Resource Department) of DISCOMs. Only a few of the DISCOMs have their training policy, such as MPMKVVCL (MP Madhya Kshetra Vidyut Vitaran Corporation Ltd), MPPKVVCL (MP Paschim Kshetra Vidyut Vitaran Co. Ltd), KSEB, WBSEDCL, MAHADISCOMs etc. (Gupta & Agarwal, 2018; Roy & Verma, 2016). In line with the national training policy for the power sector (MoP GoI, 2002), the policies have components as

- Training organisation's structure and infrastructure: This covers the role and responsibility of the division for conducting the training programme. Mainly the head of HR is responsible for training, and this division is in charge of carrying out the training programme.
- Training budget: This section states the budget for training primarily as 1.5% of the annual salary budget, i.e., varying from ₹30-₹150 million. The same was validated from the protocol response.
- Training Man Days: 3–5-man days of training for each employee
- Training needs assessment (TNA): Once in 02-05 years
- Training calendar: preparation process of annual training calendar incorporating the TNA, Budget
- Training nominations process: Select an employee for a training programme.

- Training faculties and honorarium cost: The important cost of resources for training, i.e. faculty cost
- Training feedback: The reaction of participants to the training

[Compiled by Author, Ref : (Training policy of Madhya Pradesh Madhya Kshetra Vidyut Vitaran Company Limited, 2019; Training Policy Madhya Pradesh Pashchim Kshetra Vidyut Vitaran Company Limited, 2022; Training Policies Compendium, 2015; Tripura State Electricity Corporation Limited, 2020)]

An evaluation or assessment of training, such as pre-post assessment of training, is included in the policy. However, unlike the newly formed MPPKVCL training policy, DISCOMs training policy lacks any effectiveness of training. Moreover, rural electrification training funded by MoP and GoI and conducted at DISCOMs does not mandate training effectiveness.

Based on the findings of the research, the training DISCOMs can adopt the following into their policy:

Assessment Of Training: The training effectiveness should be calculated. The annual calendar will continue with the training having more ROI. In contrast, training with less ROI will be analysed for improvement or dropped depending on the scenario with the available budget. The training effectiveness will be evaluated based on the proposed framework suggested in the study.

1. A policy to calculate the cost of training aims to calculate expenses more precisely with minor variation and manage costs in enterprises growing exponentially. This is especially significant in the distribution of the power sector. As a result, it is critical to understand expenses and apply them to product prices.
2. A policy to calculate the benefit of training is critical to assess the training's advantages and be able to translate them into figures.

3. ROI will be calculated once all the soft and hard data related to the cost and benefit of the programme are captured. The framework suggested by the researcher provides a layout of how and what to invest in training for rural electrification. The policy also highlights the calculation of ROI to ascertain the utility derived from the investment made.
4. The ROI-based training effectiveness framework will analyse all the training programmes conducted in the year. This will enable DISCOMs to track training effectiveness, investment in training its workforce, and training advantages. Therefore, this policy is best to be implemented for DISCOMs in India.

4.7 SUMMARY

- Chapter 4 incorporates the responses to the interview protocol conducted. It is segmented into four heads: Introduction, the demographic profile of the respondents, data analysis and interpretation of data.
- The respondents' introduction and demographic profile are preliminary data passively used in data analysis. Data analysis comprises three steps 1) data management, 2) descriptive accounts and 3) explanatory accounts. Data management is used to familiarize readers with the reading and re-reading of data, identify initial themes and categories, develop a code index, and assign data to the themes and categories. Descriptive accounts include summarised and synthesised range and diverse coded data by refining initial themes to identify an association between themes and develop more abstract concepts. Finally, explanatory accounts have developed associations/patterns with concepts and themes, interpreting the concepts and themes and seeking a more comprehensive application of concepts and themes.
- The findings of the research were analysed with framework methodology (Smith & Firth, 2011; Ritchie et al., 2003) with three-step analysis, i.e., data management, descriptive analysis and data interpretation. Nine hundred seventy-seven open codes developed from the transcript identified 13 initial categories, which led to the development of 11 refined categories consolidated to 9 initial themes and then 7 final themes from which four concepts emerged. The proposed framework was developed from the analysis of the findings on the core concepts of calculation of cost of training, calculation of benefits of training, ROI methodology, and effectiveness of training are discussed to reach the proposed framework.
- The ROI Methodology of the framework covers the measures of ROI on Training and the Training investment of DISCOMs for rural electrification. Finally, the framework for training effectiveness focused on factors impacting the result of ROI and isolation of the effect of training.

CHAPTER 5

CONCLUSIONS AND SUGGESTIONS

This chapter presents the proposed framework for ROI of rural electrification trainings of DISCOMs of the Indian Power Sector. The Chapter concludes the discussion on research findings as per the research problem. In addition, this Chapter contains a presentation of the significant contributions of the study, along with their implications on the Business Problem spelt out in chapter one. Some suggestions for future research roadmap follow these. Finally, the present chapter also outlines the limitations of the present study.

5.1 INTRODUCTION

The electricity Act 2003 and its proposed amendments envisaged a reform across the power sector from vertically integrated utility to unbundled entities having a competitive wholesale and retail market. However, the natural monopoly of DISCOMs, coupled with its political economy, has fostered inefficiency in operation and is a significant impediment to this reform (Electricity Act 2003, 2003; Draft EA 2003 Amendment Bill of 2018, 2018; Draft Electricity Act 2003 Amendment Bill, 2020, 2020). The High AT&C Loss (Aggregate Technical and Commercial Loss) absence of cost-reflective tariff leads to Aggregate Revenue Requirement falling behind Average cost of Service (ACS) (Paul & Tyagi, 2021). In 2019–20, distribution utilities incurred a total expenditure of ₹ 7,60,393 crore against the total revenue of ₹ 6,86,393 crore (on a subsidy-booked basis with UDAY grants included) (PFC Ltd, 2021). These historical shortcomings ultimately result in a high level of debt and payments owed to generation companies. The overdue amount to GENCOs stood at ₹100,120 crores in Nov 2021, although DISCOMs have a massive burden of borrowing (PFC Consulting, 2021). The borrowing of DISCOMs is ₹5,14,237 crore as of March 31, 2020, which is 2.3% of nominal GDP (PFC Ltd, 2021). With such constraints on finance, DISCOMs could

neither focus on augmenting its aged distribution infrastructure nor invest much in the Training & development of its human resource. Poor financial health DISCOMs act as barriers to promoting competition and integration of renewable power (Paul & Tyagi, 2021; Tyagi & Ali, 2020). India has a vision of 450 GW of renewable generation as a part of its sustainability goal (MNRE, 2021), which requires a commercially viable distribution utility supplying sustainable and reliable electricity at an affordable price for the end consumer and society as a whole (CEA, 2018; IEA, 2021; Painuly et al., 2021; R. Tyagi et al., 2020; R. K. Tyagi, 2012). This will impact more per capita electricity consumption, having a long-term effect on improving quality of life and an equitable, inclusive society. Various reports such as the working group of power on the 12th plan, National training policy persistently lack training infrastructure, comprehensive training practices and lack of skilled manpower for meeting DISCOMs challenges (MoP GoI, 2002; Planning Commission, 2012; Tyagi & Vishwakarma, 2017; Vishwakarma & Tyagi, 2016).

Whereas DISCOMs are the most crucial element in the power value chain towards last-mile connectivity, providing connection and power to all. Thus DISCOMs were the focal point of rural electrification efforts for more than 50 years, with all funds being invested to add assets or build institutional capabilities of DISCOMs (Josey et al., 2018). The concept of rural electrification in India initially focused on “electrification for irrigation” to increase the country's agricultural production. Later this changed to a more focused and comprehensive approach recognising the importance of connection to all (Samanta, 2015). With 100% village electrification in April 2018, the focus of the rural electrification policies was shifted towards household electrification, including BPL (below poverty line) households until 2020. The challenge lies in shifting focus from connection to power for all (Shakti foundation, 2021). The newly launched revamped distribution scheme also focuses on augmenting Distribution efficiency towards reliable and affordable power for end consumers. Most of them are in rural areas

(MoP GOI- RDS Scheme, 2021) (Rural consumers are more than 70% of total DISCOMS consumers).

The policies of rural electrification had capacity building components. In the policy statement, 2012-17 of RGGVY (subsumed in DDUGJY in 2015), the Govt of India has made a budgetary allocation of ₹1500 million for the National Training Programme (NTP) (REC, 2005). Similar provisions existed in other govt of India schemes, such as (the RAPDRP scheme subsumed as IPDS in 2015). Despite its urban orientation, the allocation amounting to ₹ 10,000 million for capacity building was made in DISCOMs. The newly launched revamped distribution scheme (RDS) has ₹20,000 million for training/Capacity building of DISCOMs as stated in part B, i.e. enabling charges under GBS (Govt Budgetary Support) of ₹103,000 million towards providing affordable, sustainable and reliable power to consumers (MoP GOI- RDS Scheme, 2021). Apart from Govt Support Training for rural electrification initiatives, DISCOMs train their employees at their training centre and other training institutes in the power sector such as RECIPMT, NPTI, ESCI, CPRI etc. Almost all of the DISCOMs have their training institute. However, the training infrastructure requires revamping.

DISCOMs' manpower is not trained in the new technologies and practices, resulting in poor performance and reduced customer satisfaction, thus requiring regular updating of employees' skills (Tyagi & Vishwakarma, 2017). Whether run in-house or conducted externally, most training programs are attended only by those who can be spared from such training programs (Daruka, 2015). Comprehensive training practices require analysis and evaluation training (Roy & Verma, 2016). DISCOMs require skilled manpower to improve performance in loss reduction and provide reliable power on a sustainable basis (Bhupinder, 2015; Gidey, 2018; Munasinghe, 2019; Rebekh, 2018). Therefore, it was concluded that **the lack of ROI-based training effectiveness framework of RE Training in DISCOMs leads to opportunity costs in the Indian Power Sector.**

Dr J.P. Tripathi & Arti Bansal (2017) detailed several models of training evaluation exist, such as Kirkpatrick- 4 Level Training Evaluation Model (1959), Daniel Stufflebeam -CIPP evaluation model (1960), Robert Stake – Responsive Evaluation Model (1967), Warr, Bird and Rackham -The CIRO model (1970), Robert Brinkerhoff- The Success Case Study Method (1983), Kaufman – Five-Level Evaluation (1994), Dr Jack Phillips- Added 5th Step, i.e., ROI to Kirkpatrick's 4 Level (1995) (Tripathy & Thakur, 2014). However, no comprehensive training evaluation model exists in any DISCOMs (Josey et al., 2018; MoP GOI- RDS Scheme, 2021; Shakti foundation, 2021).

$$\text{ROI of Training is defined as ROI (\%)} = \frac{\text{Benefit of training} - \text{Cost of training}}{\text{Cost of training}}$$

where cost of training = tangible costs + intangible costs and

benefits of training = tangible benefits + intangible benefits (Jasson & Govender, 2017; Lynch et al., 2006)

ROI is the best tool to know how the training investment contributes to building institutional capabilities towards higher revenue but measuring the same is relatively tricky. It is much more difficult for DISCOMs with commercial and profitability oversight (Subramanian et al., 2012). With a dearth of literature on the framework for training evaluation in DISCOMs, with the importance of ROI in decision-making on training investment, the question arises: What should be the framework for ROI of rural electrification training of DISCOMs? This thesis aims to formulate the framework for the ROI of rural electrification training of DISCOMs.

5.2 CONCLUSION

This study aims to develop the framework *for ROI of Rural Electrification Trainings of DISCOMs*. This section of the chapter summarises the discussion of the major findings reached throughout this study in relation to the research problem, “*What should be framework for ROI of rural electrification trainings of DISCOMs?*”

The conclusion of the present study is in line with the research problem and suggests that an ROI-based Training framework is to be adopted in DISCOMs for all of its training programmes. The ROI-based framework will help DISCOMs decide which training programme is effective and which one requires modification or even cancellations towards meeting its DISCOMs Trilemma of providing affordable, sustainable and reliable power with higher customer service. It justifies the investment made in programme cost by quantifying values obtained from the programme. Ministry of power primarily funds rural electrification training, GoI through the capacity building components of govt of India schemes investing more than ₹1500 million over the last decades. The capacity building components of the MoP, and GoI, especially the training components of various rural electrification programmes, provide significant training expenditure for DISCOMs besides its training efforts. The aim of all historical rural electrification schemes, including the recently launched revamped Distribution sector Scheme (RDS), is also focused on reliable, affordable and sustainable power for rural electrification. Adoption of ROI based framework for its effectiveness of Training will give more focus on the importance of training activities towards achieving the objectives of such programmes and choosing more beneficial training programmes, value-added training activities training and an overall culture of competitive decision making on all expenditures based on its return similar like other investments of DISCOMs.

Calculation of Cost of Training		
The time for calculation of cost	The cost incurred during the training program	Measure intangible cost
Calculation of Benefits of Training		
Benefits of Training DISCOMs	Intangible benefits of Training in DISCOMs in general and for the power sector	Measure intangible benefits
Time for calculation of benefit	Short, medium and long benefits of Training	Benefits of a training framework for rural electrification
ROI Methodology		
Measures of ROI on Training	Training investment of DISCOMs for rural electrification	
Effectiveness of Training		
Factors that impact the result of ROI	Isolate effect of Training	
To formulate the framework for ROI of Rural Electrification Trainings of DISCOMs		

Figure 5.1: Framework for ROI of Rural Electrification Trainings of DISCOMs

A brief discussion of the proposed framework is presented below

5.3 IMPLICATIONS AND SUGGESTIONS OF THE STUDY

The implication of the research connects research findings with the problem statement (Booth et al., 2008b; Saunders et al., 2007). Therefore, this section recommends the study's conclusion in addressing the business problem: **“Lack of ROI-based training effectiveness framework of RE Training in DISCOMs is leading to opportunity costs in the Indian Power Sector”**.

This research helps formulate a framework for the ROI of rural electrification trainings of DISCOMs. This helps DISCOMs effectively utilise the training investment in the programmes that are more beneficial to DISCOMs to address various challenges, the trilemma of DISCOMs (ETBureau, 2019) as mentioned 1.5.1 in this research abstract. DISCOMs Challenges post 100% rural connection ensure reliable, affordable and sustainable power for all need to be

addressed with skilled manpower (Josey & Sreekumar, 2015; Manabika et al., 2019). This has improved individuals, Society, DISCOMs, the power sector, and the nation.

5.3.1 THEORETICAL IMPLICATIONS

The study had the theoretical premises of Phillips theory on ROI (Return of investment) of training. Another theory used was training effectiveness, review methodology and framework analysis. The research contributed to the theory of return on investment of training.

Philip added his ROI theory to the top 4 levels popular framework for training effectiveness by Kirkpatrick (Russell, 2020). Despite the many intangible challenges associated with measuring human capital, many companies have widely implemented calculating the ROI of training departments. This exploratory study looks into the costs and contributions of training, as well as the challenges of gathering data, finding time to analyse results, and measuring learning levels, as well as training investments considered necessary for ROI calculation.

The study finds that the period for calculating cost and benefit of training is the most important area that can change the ROI results. As the benefit of training may go in the short-run, medium-run and even lifelong for some behavioural skill training, the existing literature on ROI did not address its framework.

Moreover, my research finds that factors of effectiveness of training such as motivation, attitude, emotional intelligence, support from management and peers, training style and environment, the open-mindedness of a trainer, job-related factors, self-efficacy and essential ability etc. and its effect on the ROI of training and is to be directly mapped in the existing ROI framework of training.

5.3.2 ECONOMIC IMPLICATIONS

DISCOMs face many challenges, including massive accumulated debts, inability to pay generators on time, and are viewed as the most significant barrier to Sustainable, Affordable, and Reliable power. Rural distribution covers more than 70% of any Electricity Distribution Company (DISCOM) geography, and AT&C losses have a significant effect on the financial health of DISCOMs. The High AT&C Loss (Aggregate Technical and Commercial Loss) absence of cost-reflective tariff leading to Aggregate Revenue Requirement falling behind Average cost of Service (ACS). In 2019–20, distribution utilities incurred a total expenditure of ₹ 7,60,393 crore against the total revenue of ₹ 6,86,393 crore (on a subsidy-booked basis with UDAY grants included). These historical shortcomings ultimately result in high debt and payments owed to generation companies. The overdue amount to GENCOs stood at ₹100,120 crores in Nov 2021, although DISCOMs have a massive burden of borrowing. The borrowing of DISCOMs is ₹5,14,237 crore as of March 31, 2020, which is 2.3% of nominal GDP. With such constraints on finance, DISCOMs could neither focus on augmenting its aged distribution infrastructure nor invest much in the Training & development of its human resource. **ROI-based effectiveness of training framework will help DISCOMs choose its already constrained investment towards more beneficial programmes to improve existing training programmes towards better results.** This will further affect the Indian Power Sector as a whole. It was the same purpose as stated 18 years ago with the enactment of the electricity act for “promoting competition therein, protecting the interest of consumers and supply of electricity to all areas”.

The improvement in DISCOMs in providing reliable, affordable and sustainable power for rural electrification has implications for rural populations and thus nations' GDP. Indian rural population, numbering 0.93 billion (India's Total Population of 1.34 billion), contributed a sizable ₹101.69 million towards gross domestic product (GDP). India's total GDP for 2019-20 stands at ₹203.39 million. The computation of these GDP figures is at a constant price. The rural income for the same period stands at ₹100,500,000 million. Agriculture alone

adds 16% to the national GDP, employing 41.5% of the Indian population. Moreover, the Indian rural economy, due to its resilience during the pandemic, registered a growth of 34% in rural GDP.

Thus, my research findings on the framework of ROI-based Training in DISCOMs will help DISCOMS bridge the skill gap, enhance its institutional capacity to minimise opportunity losses, and take measures toward providing reliable, affordable, and sustainable power for nation-building. It will also help in the financial turnaround of DISCOMs by reducing AT&C Losses and adopting a customer-centric approach. Furthermore, the ROI-based training framework will help DISCOMs effectively in its RE training programme towards bridging the skill gap and enhancing its institutional capacity.

5.3.3 POLICY IMPLICATIONS

This research provides specific policy suggestions for such centrally funded Rural electrification schemes or schemes aimed at universal electrification. The policies of rural electrification had capacity building components (MoP GoI). For example, in the policy statement, 2012-17 of RGGVY (subsumed in DDUGJY in 2015), the Govt of India has made a budgetary allocation of ₹1500 million for the National Training Programme (NTP). Similar provisions existed in other govt of India schemes, such as (the RAPDRP scheme subsumed as IPDS in 2015). Despite its urban orientation, the allocation for capacity building to DISCOMs was ₹10,000 million. DISCOMs are the retailer, and DISCOMs have been the focal point of rural electrification efforts for more than 50 years, with all funds being invested to add assets or build institutional capabilities of DISCOMs.

My research suggests that utilising the capacity building components of the rural electrification scheme will be more effective for DISCOMs implementing an ROI-based effectiveness framework for the training programme. The same framework will also be helpful for DISCOMs' self-funded training.

This implication is also helpful for all existing or upcoming schemes of MoP, GoI. For example, the newly launched revamped distribution scheme (RDS) has ₹20,000 million for training/Capacity building of DISCOMs as stated in part B, i.e. enabling charges under GBS (Govt Budgetary Support) of ₹103,000 million towards providing affordable, sustainable and reliable power to consumers. Adopting such a framework of ROI-based effectiveness of rural electrification training will contribute to DISCOMs, the Indian Power Sector and Rural India.

5.3.4 MANAGERIAL IMPLICATIONS

This study improves the understanding of the management of DISCOMs for RE training and capacity building practices. This study enriches and fills the gap in the literature on the ROI of training. The management of different DISCOMs must play the leadership role in effectively adopting the ROI-based effectiveness framework of rural electrification training. The same will have implications in strategic training policy formulations and the implementation of data-centric culture in the organisations to have the soft and hard data of the skill.

5.3.4.1 Strategical Implications

The research suggests that adopting a framework of ROI-based effectiveness of rural electrification training will focus more on the strategic formulation of training policy which will have more ROI. As training need analysis has clear implications for organisational goals therefore, the management needs to strategically formulate a training programme to address the challenges of the DISCOMs towards its goal of providing reliable, affordable and sustainable power.

5.3.4.2 Functional Implications

Adopting a framework of ROI-based effectiveness of rural electrification training will face the challenges of implications such as unavailability of data, focus on training etc. Organisations need to have a culture of readily available data and focus on training as an essential activity. These will improve the overall data-centric, goal-driven profession approach in DISCOMs, which will positively impact the entire value chain of the Indian power sector.

5.4 FUTURE SCOPE OF THE STUDY

A researcher may undertake his future research on the following research areas as an extension of this study:

1. The study focused on formulating a framework of ROI-based effectiveness of rural electrification training. The same concept may be tested with DISCOMs.
2. The study focuses on the rural electrification training of DISCOMs. It does not cover the impact of training of contractual workforce associated with DISCOMs and in downstream DISCOMs such as rural folks engaged in house wiring, repair and maintenance of the electrical facility in rural households and community premises. There is a scope for further research in this area.
3. The suggested framework has been developed for Indian DISCOMs. However, adopting the same framework for any other country may require modification-based training practices and availability of the utility's data.

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APPENDICES

A1 REVIEW TRANSCRIPT CODEBOOK

A1.1 REVIEW PROFILE

Appendix 1 represents the literature selected through the review process from the existing 343 documents of chapter 2. In chapter 2, 603 literature (searched through keywords) was narrowed to these 343 documents through screening, retrieval and in-depth analysis. The table shows the literature review categorised as per qualitative, Quantitative and Mix Methodology for further validation.

A1.1.1. Literature Profile Under Review

Sl.No	Title of the article	Author	Year	Type of Study
1	The Utilization of Training Program Evaluation in Corporate Universities	Christopher F. Bober, Kenneth R. Bartlett	2004	Cousins and Leithwood framework
2	The electricity-livelihood nexus: some highlights from the Andhikhola Hydroelectric and Rural Electrification Centre (AHREC)	Bastakoti, Badri Prasad	2006	Rural Electrification Training in Indian DISCOMs
3	Power Sector Reforms: A Study on its Strategic Implications and Impacts on selected Companies in Gujarat	Mr. Rajiv Kurulkar	2008	Power growth
4	Rural electrification: Accelerating impacts with complementary services	Peters, Jörg Jorg	2009	Effectiveness of Training
5	The Effects of Rural Electrification on Employment: New Evidence from South Africa	Dinkelman, Taryn	2011	Rural Electrification Training in Indian DISCOMs
6	Business Impact and ROI: A Proposed Approach to Learning and Development Investment	Mohamed, A.Rasli, A.Mansor, N.N. Abu	2012	ROI in Training

7	Effects of Training on Employee Performance.	Aidah Nassazi	2013	Effectiveness of Training
8	Study of HRD Practices in Selected PSUs of Oil and Gas Sector- Special Reference to Non- Managerial Employees Training and Development	Upadhyay, Bhola Nath	2013	Effectiveness of Training
9	Surge in Solar-Powered Homes	Shahidur R. et al	2014	SHS Supply
10	Study on Evaluation of Skills Training Effectiveness in Electric Power Corporation	Wenyu Zhang Yan Chen	2014	Effectiveness of training
11	Measuring effectiveness of manager training in a government service delivery agency based on training appraisals	Artman, Sherrie et al.	2015	Effectiveness of training
12	Electricity Sector Regulation and Sustainable Development Outcomes: an Analysis of Regulatory Impact in 12 Indian States for 2001-2010	Gopal Krishna Sarangi	2015	Power growth
13	Learning between projects: More than sending messages in bottles	Hartmann, Andreas Doree, Andre	2015	Effectiveness of training
14	India Energy Outlook	International Energy Agency Report (IEA)	2015	Rural Electrification Training in Indian DISCOMs
15	Trainer attributes as drivers of training effectiveness	Chukwu, Gosim Martin	2016	Effectiveness of training
16	A Case Study on Exploring the Relevance of Evaluation Characteristics in Designing an Evaluation Approach on Behaviour Level on Training Effectiveness	Soraya Mohammad	2016	Effectiveness of training
17	A framework for determining the return on investment of simulation-based training in health care	Bukhari, Hatim, Andreatta, Pamela, Goldiez, Brian	2017	ROI in Training

18	Factors Influencing Training Effectiveness: Evidence from Public Sector in Bahrain	Ehsan Saeed Idrees et al.	2017	Kirkpatrick model
19	A novel renewable energy selection model for United Nations' sustainable development goals	Büyüközkan, Gülçin Karabulut, Yağmur Mukul, Esin	2018	Sustainable contribution of entrepreneurship
20	A Comparative Analysis of Trainees and Trainers Perceptions Regarding Training Programmes in Indian Banking Sector. Journal of Strategic Human Resource Management	Athar Mahmood Ritu Narang	2018	Effectiveness of training
21	Towards the achievement of SDG 7 in sub-Saharan Africa: Creating synergies between Power Africa, Sustainable Energy for All and climate finance in-order to achieve universal energy access before 2030	Chirambo, Dumisani	2018	Rural Electrification Training in Indian DISCOMs
22	Clean cooking and the SDGs: Integrated analytical approaches to guide energy interventions for health and environment goals	Rosenthal, Joshua et al.	2018	Rural Electrification Training in Indian DISCOMs
23	Comparative Study of HRD Policies And Job Satisfaction of Employees of Public And Private Sector Banks	Ganguly, Bijoya	2018	Effectiveness of training
24	Agrivoltaics provide mutual benefits across the food–energy–water nexus in drylands	Barron-Gafford et al.	2019	Rural Electrification Training in Indian DISCOMs
25	The sustainability impact of new ventures Measuring and managing entrepreneurial contributions to sustainable development	Horne, Jannic	2019	Sustainable contribution of entrepreneurship
26	Exploring entrepreneurship related to the sustainable development goals - mapping new venture activities with semi-automated content analysis	Horne, Jannic et al.	2020	Sustainable contribution of entrepreneurship

27	Money, Energy, and Welfare: The State and the Household in India's Rural Electrification Policy	SARMILA BOSE.	1993	Rural Electrification Training in Indian DISCOMs
28	'Rural electrification and efforts to create enterprises for the effective use of power'	Badri Prasad Bastakoti	2003	Rural Electrification Training in Indian DISCOMs
29	Construction safety training via e-Learning: Learning effectiveness and user satisfaction	Ho, Chun-Ling Dzeng, Ren-Jye	2010	Effectiveness of training
30	Assessment Effectiveness on the Job Training in Higher Education (Case Study: Takestan University)	Mollahoseini, Ali Farjad, Shahrooz	2012	Kirkpatrick model
31	Rural electrification implementation strategies through microgrid approach in South African context	Z. Xu, M. Nthontho, S. Chowdhury	2014	Cost Optimisation Strategy
32	Rural Electrification and Household Labor Supply: Evidence from Nigeria	CLAIRE SALMON and JEREMY TANGUY	2015	Rural Electrification, Economic Policy
33	Evaluation of the Effectiveness of Global Organization's Internal Training from Customer Point of View	Maiju Myllynen	2016	Kirkpatrick model
34	Corporate social responsibility and dimensions of performance: An application to U.S. electric utilities	Amer Ait Sidhoum & Teresa Serra	2017	CSR
35	A proposed quantitative methodology for the evaluation of the effectiveness of Human Element, Leadership and Management (HELM) training in the UK	F. Saeed et al.	2017	Human Element, Leadership and Management (HELM)
36	Workplace Competence Assessment and Development of Frontline Managers at Indian Power Companies	Ruchi Tyagi and Suresh Vishwakarma	2017	Rural Electrification

				Training in Indian DISCOMs
37	Training transfer intention and training effectiveness	Al-Swidi, Abdullah Al Yahya, Mohammed	2017	TPB -Theory of planned behaviour
38	The evaluation of training and development of employees: The case of a national oil and gas industry	Al-Mughairi, Aliya Mohammed	2018	Kirkpatrick Model
39	Training, human capital, and gender gaps in entrepreneurial performance	Brixiová, Zuzana	2019	Effectiveness of training
40	Evaluating Entrepreneurship Education Programmes in Developing Countries: Lessons from Experience	Gerald Braun	2012	Effectiveness of training
41	Study on Evaluation of Skills Training Effectiveness in Electric Power Corporation. Applied Mechanics and Materials	Zhang, Wen Yu ; Chen, Yan	2013	Effectiveness of training
42	Case study evaluating the impact of QFA Training on Organisational Performance in a Credit Union using the Phillips ROI Model	Mcdonagh, Mary	2016	Effectiveness of training

**A1.1.2 QUALITATIVE, QUANTITATIVE & MIXED METHOD TABLE
of Literature Profile Under Review**

Qualitative			
Author	Year	Journal	Method
Christopher F. Bober, Kenneth R. Bartlett	2004	Cousins and Leithwood framework	Qualitative Method
Bastakoti, Badri Prasad	2006	Rural Electrification Training in Indian DISCOMs	Qualitative Method
Mr Rajiv Kurulkar	2008	Power growth	Qualitative Method
Jörg Peters Marek Harsdorff, Florian Ziegler	2009	Effectiveness of Training	Qualitative Method
Dinkelman, Taryn	2011	Rural Electrification Training in Indian DISCOMs	Qualitative Method
Mohamed, A.Rasli, A.Mansor, N.N. Abu	2012	ROI in Training	Qualitative Method
Aidah Nassazi	2013	Effectiveness of Training	Qualitative Method
Upadhyay, Bhol Nath	2013	Effectiveness of Training	Qualitative Method
Shahidur R. Khandker, Hussain A. Samad, Zubair K. M. Sadeque, Mohammed Asaduzzaman, Mohammad Yunus, and A.K.F. Hossain	2014	SHS supply	Qualitative Method
Wenyu Zhang Yan Chen	2014	Effectiveness of training	Qualitative Method
Artman, Sherrie Kerr, Bernard J. Jones, Jerry Meckstroth, David	2015	Effectiveness of training	Qualitative Method
Gopal Krishna Sarangi	2015	Power growth	Qualitative Method
Hartmann, Andreas Doree, Andre	2015	Effectiveness of training	Qualitative Method
International Energy Agency Report (IEA)	2015	Rural Electrification Training in Indian DISCOMs	Qualitative Method

Chukwu, Gosim Martin	2016	Effectiveness of training	Qualitative Method
Soraya Mohammad	2016	Effectiveness of training	Qualitative Method
Bukhari, Hatim, Andreatta, Pamela, Goldiez, Brian	20 17	ROI in Training	Qualitative Method
Ehsan Saeed Idrees Yaqoot Wan Shakizah Wan Mohd. Noor Mohd Faizal Mohd Isa	20 17	Kirkpatrick model	Qualitative Method
Athar Mahmood Ritu Narang	20 18	Effectiveness of training	Qualitative Method
Büyükožkan, Gülçin Karabulut, Yağmur Mukul, Esin	20 18	Sustainable contribution of entrepreneurship	Qualitative Method
Chirambo, Dumisani	20 18	Rural Electrification Training in Indian DISCOMs	Qualitative Method
Ganguly, Prof Bijoya	20 18	Effectiveness of training	Qualitative Method
Rosenthal, Joshua Quinn, Ashlinn Grieshop, Andrew P. Pillarisetti, Ajay Glass, Roger I.	20 18	Rural Electrification Training in Indian DISCOMs	Qualitative Method
Barron-Gafford, Greg A. Pavao- Zuckerman, Mitchell A. Minor, Rebecca L. Sutter, Leland F. Barnett-Moreno, Isaiah Blackett, Daniel T. Thompson, Moses Dimond, Kirk Gerlak, Andrea K. Nabhan, Gary P. Macknick, Jordan E.	20 19	Rural Electrification Training in Indian DISCOMs	Qualitative Method
Horne, Jannic	20 19	Sustainable contribution of entrepreneurship	Qualitative Method
Horne, Jannic Recker, Malte Michelfelder, Ingo Jay, Jason Kratzer, Jan	20 20	Sustainable contribution of entrepreneurship	Qualitative Method

Quantitative				
Ref No:	Author	Year	Journal	Method
1	SARMILA BOSE. Delhi: Oxford University Press, 1993.	1993	Rural Electrification Training in Indian DISCOMs	Quantitative Method
2	Badri Prasad Bastakoti	2003	Rural Electrification Training in Indian DISCOMs	Quantitative Method
7	Ho, Chun-Ling Dzeng, Ren-Jye	2010	Effectiveness of training	Quantitative Method
11	Mollahoseini, Ali Farjad, Shahrooz	2012	Kirkpatrick model	Quantitative Method
17	Z. Xu, M. Nthontho, S. Chowdhury	2014	Cost Optimization Strategy	Quantitative Method
19	CLAIRE SALMON and JEREMY TANGUY	2015	Rural Electrification, Economic Policy	Quantitative Method
24	Maiju Myllynen	2016	Kirkpatrick model	Quantitative Method
27	Al-Swidi, Abdullah Al Yahya, Mohammed	2017	TPB -Theory of planned behaviour	Quantitative Method
28	Amer Ait Sidhoum & Teresa Serra	2017	CSR	Quantitative Method
31	F. Saeed1 & A. Wall & C. Roberts & R. Riahi & A. Bury	2017	Human Element, Leadership and Management (HELM)	Quantitative Method
32	Al-Mughairi, Aliya Mohammed	2018	Kirkpatrick Model	Quantitative Method
39	Brixiová, Zuzana	2019	Effectiveness of training	Quantitative Method
43	Ruchi Tyagi and Suresh Vishwakarma	2017	Rural Electrification Training in Indian DISCOMs	Quantitative Research

Mixed				
Ref No:	Author	Year	Journal	Method
9	Gerald Braun	2012	Effectiveness of training	Mixed-Method
14	Zhang, Wen Yu ; Chen, Yan	2013	Effectiveness of training	Mixed-Method
25	Mcdonagh, Mary	2016	Effectiveness of training	Mixed-Method

A1.2 MIXED METHODOLOGY ANALYSIS TOOL (MMAT)

MMAT is an important evaluation tool developed for the evaluation stage of systematic reviews of mixed studies. It is a review that includes qualitative, quantitative, and mixed method studies. This allows you to evaluate the methodological quality of five categories of studies: qualitative studies, randomized controlled trials, non-randomized studies, quantitative descriptive studies, and mixed method studies.

MMAT was developed in 2006 (Pluye et al., 2009a) and revised in 2011 (Pace et al., 2012). This 2018 version was developed based on literature reviews of critical assessment tools, interviews with MMAT users, and eDelphi research by international experts (Hong, 2018).

MMAT can be used to assess the quality of empirical studies, that is, primary studies. Experimental, observational, or simulation-based studies (Abbott, 1998; Porta et al., 2014). It cannot be used for inexperienced work such as reviews and theoretical work. In addition, MMAT allows the evaluation of the most common types of learning methods.

A1.3 REVIEW TRANSCRIPTS

Sr. No:	Authors	Transcript	Description	Preliminary Thoughts	Open Code	Initial Category	Refined Category	Sub-themes	Themes	Concept	Concept Code
1	Bailey, Allan	Because of its appropriateness to the business setting, the evaluation model that emerged from the work of Dr Donald Kirkpatrick and Dr Jack Phillips has become the most credible and most widely used training and HRD evaluation methodology in the world. In particular, the Phillips ROI Methodology offers a practical way to forecast the potential payoff—return on investment (ROI)—of a proposed training or human resources development initiative before funds are committed.	ROI Methodology	Phillips ROI methodology offers a practical way to forecast the potential payoff of proposed training or human resources development initiative before funds are committed	ROI methodology offers a practical way to forecast the potential payoff before funds are committed	ROI methodology offers a practical way (to forecast the potential payoff)	ROI methodology offers a practical way (to forecast the potential payoff)	Training budget (keeping in mind the cost and benefit analysis)	CALCULATION OF COST OF TRAINING	Return on Investment	ROI
2	Bailey, Allan	The MCPCC ROI Forecasting Tool, based on the Phillips approach, is an easy-to-use decision support tool that allows organizations to quickly develop and examine the business case for investing in workforce development. While the tool itself is a self-contained and self-explanatory ROI calculator, the following is a brief overview of the ROI Methodology™ underlying the forecasting tool. ROI and cost-benefit analysis are familiar decision-making tools used in business management worldwide. They are used most commonly to analyze planned investment decisions for the acquisition of capital equipment and technology. At its simplest, ROI is the ratio of the net benefits of an investment compared to its total costs.	ROI Tools	The MCPCC ROI Forecasting Tool, based on the Phillips approach, is an easy-to-use decision support tool that allows organizations to quickly develop and examine the business case for investing in workforce development.	ROI forecasting tool allows organizations to quickly develop and examine the business case for investing.	ROI methodology offers a practical way (to develop & examine business care)	ROI methodology offers a practical way (to develop & examine business care)	Training budget (keeping in mind the cost and benefit analysis)	ROI Methodology	Return on Investment	ROI

Sr. No:	Authors	Transcript	Description	Preliminary Thoughts	Open Code	Initial Category	Refined Category	Sub-themes	Themes	Concept	Concept Code
3	Barnett, Kent Mattox, John R.	When measuring outcomes in corporate training, the authors recommend that it is essential to introduce a comprehensive plan, especially when resources are limited and the company needs are vast.	Training plan	It is essential to introduce a comprehensive plan, especially when resources are limited and the company needs are vast.	The comprehensive planning is essential when company has limited resources and needs are vast	Comprehensive plan is essential while measuring outcomes in corporate training	Importance of comprehensive plan for corporate training	Isolate effect of training	Effectiveness of training	Framework of Training	FOT
4	Barnett, Kent Mattox, John R.	The authors hone in on five critical components for shaping a measurement plan to determine the success and ROI of training. The plan's components should provide a roadmap to address complex corporate training environments in which large numbers of courses are delivered to thousands of learners. Recommendations offered apply equally in smaller, less complex organizations. Following a brief historical perspective covering the development of evaluation methods, the authors examine each of their five critical components- strategy, measurement models, resources, measures and cultural readiness. They claim that while their approach applies to all learning methods, it is especially useful in technology mediated programs, such as self-paced, web-based, online-facilitated, and simulation courses.	ROI of training	Five critical components for shaping a measurement plan to determine the success and ROI of training. Approach applies to all learning methods, it is especially useful in technology mediated programs, such as self-paced, web-based, online-facilitated, and simulation courses.	The comprehensive planning is essential when company has limited resources and needs are vast	Comprehensive plan is essential while measuring outcomes in corporate training	Importance of comprehensive plan for corporate training	Importance of training framework	Effectiveness of training	Framework of Training	FOT

Sr. No:	Authors	Transcript	Description	Preliminary Thoughts	Open Code	Initial Category	Refined Category	Sub-themes	Themes	Concept	Concept Code
5	Bukhari, Hatim Andreatta, Pamela Goldiez, Brian Rabelo, Luis	A significant consideration has been given to the incorporation of the intangible and qualitative benefits, not only the tangible and quantitative benefits of simulation-based training in health care. The framework builds from three works: the value measurement methodology (VMM) used by several departments of the US Government, a methodology documented in several books by Dr Jack Phillips to monetize various training approaches, and a traditional return on investment methodology put forth by Frost and Sullivan, and Immersion Medical.	Framework of ROI	A significant consideration given to the incorporation of the intangible and qualitative benefits of simulation-based training in health care.	A methodology documented in several books by to monetize various training approaches, and a traditional return on investment methodology	ROI methodology offers a practical way (to ROI on investment methodology)	ROI methodology offers a practical way (to ROI on investment methodology)	Measure ROI framework	ROI Methodology	Return on Investment	ROI
6	Bukhari, Hatim Andreatta, Pamela Goldiez, Brian Rabelo, Luis	A framework that has been developed to monetize the real value of simulation-based training in health care. A significant consideration has been given to the incorporation of the intangible and qualitative benefits, not only the tangible and quantitative benefits of simulation-based training in health care.	Benefits of training	Intangible and qualitative benefits incorporation along with tangible and quantitative benefits of simulation-based training in health care	Benefits incorporated in the framework that has been developed to monetize real value of training	Benefits evaluated to measure the effectiveness of programs	Cost and benefit of ROI	Training budget (keeping in mind the cost and benefit analysis)	CALCULATION OF BENEFIT OF TRAINING	Return on Investment	ROI
7	Bukhari, Hatim Andreatta, Pamela Goldiez, Brian Rabelo, Luis	The framework builds from three works: the value measurement methodology (VMM) used by several departments of the US Government, a methodology documented in several books by Dr Jack Phillips to monetize various training approaches, and a traditional return on investment methodology put forth by Frost and Sullivan, and	VMM	The value measurement methodology (VMM), methodology documented to monetize various training approaches, and a traditional return on investment methodology, were adapted to create an integrated methodology	Framework adapted to create an integrated methodology that can be readily implemented	Benefits evaluated to measure the effectiveness of programs	Cost and benefit of ROI	Training budget (keeping in mind the cost and benefit analysis)	CALCULATION OF BENEFIT OF TRAINING	Framework of Training	FOT

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		Immersion Medical. All 3 source materials were adapted to create an integrated methodology that can be readily implemented.									
8	Bürgi, Matthias Ali, Panna Chowdhury, Afroza Heinimann, Andreas Hett, Cornelia Kienast, Felix Mondal, Manoranjan Kumar Mondal, Manoranjan Kumar Verburg, Peter H.	The integrated landscape approach has gained increasing interest of the scientific community, as well as of organizations active in the field of sustainable development. However, the enthusiastic welcome is challenged by little consensus on theory, terminology and definitions. Moreover, the operationalization of the approach into practice is a major challenge. In this paper, we present a framework to operationalize the integrated landscape approach in practice by putting a long-term collaboration between scientists and various stakeholder at center stage.	Approach to overcome challenges	The integrated landscape approach has gained increasing interest of the scientific community, as well as of organizations active in the field of sustainable development.	Approaches and methods of organizations active in the field of sustainable development	ROI methodology helping in the fields of sustainable development	ROI methodology helping in the fields of sustainable development	Effectiveness of ROI framework	ROI Methodology	Return on Investment	ROI
9	Bürgi, Matthias Ali, Panna Chowdhury, Afroza Heinimann, Andreas Hett, Cornelia Kienast, Felix Mondal, Manoranjan Kumar Mondal, Manoranjan Kumar Verburg, Peter H.	Based on encompassing understanding of landscape-level processes and interactions, four pillars addressing different steps of a joint-learning circle are described and illustrated with examples. We consider the integrated landscape approach to be a prime way of targeting the Sustainable Development Goals (SDGs), but novel forms of collaboration between scientists and other stakeholders based on long-term commitments will be needed for operationalization in practice.	Approach to overcome challenges	Landscape approach used as a prime way of targeting the Sustainable Development Goals (SDGs)	Approaches and methods of organizations active in the field of sustainable development	Approaches for different steps to learn SDGs and make operationalization in practice	Training to put Sustainable development goals in practice	Effectiveness of ROI framework	Effectiveness of training	Framework of Training	FOT

Sr. No:	Authors	Transcript	Description	Preliminary Thoughts	Open Code	Initial Category	Refined Category	Sub-themes	Themes	Concept	Concept Code
10	Farjad, Shahrooz	The Evaluation of any training programme has certain aims to fulfil. These are concerned with the determination of change in the staff behaviour and the change needed in the organizational structure. Hence evaluation of any training program must inform us whether the training programme has been able to deliver the goals and objectives in terms of cost incurred and benefits achieved.	Evaluation of training programme	Aim of evaluation of any training program is to inform whether the training programme has been able to deliver the goals and objectives in terms of cost incurred and benefits achieved.	Aims of training are concerned with change in the employee behaviour and the change needed in the organizational structure.	Aims of training towards evaluating and changing organizational structure	Aims of training towards evaluating and changing organizational structure	Importance of training framework	Effectiveness of training	Framework of Training	FOT
11	Farjad, Shahrooz	Training as the process of developing skills, Habits, Knowledge and attitudes in employees for the purpose of increasing effectiveness of employees in their present positions as well as preparing employees for future positions in organization Purpose of current research is a Evaluation Effectiveness of training courses in Islamshahr University by Kirkpatrick Model.	Training processes	Training as the process in employees for the purpose of increasing effectiveness of employees in their present positions as well as preparing employees for future positions.	Aims of training are concerned with change in the employee behaviour and the change needed in the organizational structure.	Aims of training towards evaluating and changing organizational structure	Aims of training towards evaluating and changing organizational structure	Importance of training framework	Effectiveness of training	Framework of Training	FOT
12	Farjad, Shahrooz	The effectiveness evaluation in the subject centre needed to be improved through implementation of optimizing training design, redefining training roles, providing enough budget, management commitment, attention to individual, job and organizational needs, motivation mechanism, use of ongoing and summative evaluation.	Evaluation of training programme	The effectiveness evaluation in the subject centre needed to be improved through implementation of various advance methods of evaluation	Aims of training are concerned with change in the employee behaviour and the change needed in the organizational structure.	Aims of training towards evaluating and changing organizational structure	Aims of training towards evaluating and changing organizational structure	Importance of training framework	Effectiveness of training	Framework of Training	FOT

Sr. No:	Authors	Transcript	Description	Preliminary Thoughts	Open Code	Initial Category	Refined Category	Sub-themes	Themes	Concept	Concept Code
13	Frerichs, RL Rienzo, SR Di	For while training equips a person with necessary skills and attributes that can be robotically replicated, education allows an individual to move beyond the "instructions" and adapt to incorrect or poorly written instructions, or none at all, and to improvise training to get the job done.	Benefits of training	Skills required for training and education to move beyond the instructions to improvise training to get the job done	Benefits of training and education to improvise training to get the job done	Benefits of training and education	Benefits of training and education	Importance of training framework	Effectiveness of training	Framework of Training	FOT
14	Frerichs, RL Rienzo, SR Di	The National Defense Intelligence College, now being redesignated the National Intelligence University (NIU), is chartered to provide intelligence education to members of the IC. Its programs are focused on national security challenges, including the more traditional intelligence goal of understanding adversarial capabilities and intentions, along with broader intelligence challenges such as sociocultural trends and conflicts, failed and failing states, terrorism, proliferation, and the rise of nonstate actors.	NIU advancements in training programs	National Intelligence University chartered to provide intelligence education for goals of training to be fulfilled	Universities including various program to improvise training to increase efficiency	Benefits of training and education	Benefits of training and education	Importance of training framework	Effectiveness of training	Framework of Training	FOT
15	Frerichs, RL Rienzo, SR Di	Creating and implementing education programs that address the broad and divergent needs of the IC to allow it to successfully carry out its mission necessitate an understanding of intelligence, the importance of training, the need for and nature of intelligence education, and the ability to synthesize all of these elements.	Importance of training	Creating and implementing education programs that address the importance of training, the need for and nature of intelligence education, and the ability to synthesize all of these elements.	Universities including various program to improvise training to get the job done	Benefits of training and education	Benefits of training and education	Importance of training framework	Effectiveness of training	Framework of Training	FOT

Sr. No:	Authors	Transcript	Description	Preliminary Thoughts	Open Code	Initial Category	Refined Category	Sub-themes	Themes	Concept	Concept Code
16	Giangreco, Antonio Sebastiano, Antonio Peccei, Riccardo	In particular, we focused on an analysis of the factors that affect participants' overall satisfaction with training. We first identified three key situational antecedents of training satisfaction, including trainees' perceptions of the efficiency and usefulness of the training, and their perceptions of trainer performance.	Factors affecting training	Anticipated three key factors affecting participants overall satisfaction with training	Benefits of training and education to improvise training to get the job done	Benefits of training and education	Benefits of training and education	Importance of training framework	Effectiveness of training	Framework of Training	FOT
17	Giangreco, Antonio Sebastiano, Antonio Peccei, Riccardo	Specific hypotheses relating each of these factors to training satisfaction were then developed and tested using data from a sample of about 3000 trainees from a range of Italian companies participating in a large-scale regionally-funded training programme involving over 300 different training courses. The results revealed that, although all three hypothesised antecedents were significantly positively related to training satisfaction, the perceived usefulness of training had the strongest effect. Importantly, the results also suggest the lack of any clear compensatory effects of the three antecedents on training satisfaction. Theoretical and policy implications of the findings are discussed.	Factors affecting training	It is essential to introduce a comprehensive plan, especially when resources are limited and the company needs are vast.	The comprehensive planning is essential when company has limited resources and needs are vast	Comprehensive plan is essential while measuring outcomes in corporate training	Importance of comprehensive plan for corporate training	Isolate effect of training	Effectiveness of training	Framework of Training	FOT

Sr. No:	Authors	Transcript	Description	Preliminary Thoughts	Open Code	Initial Category	Refined Category	Sub-themes	Themes	Concept	Concept Code
18	Jasson, Cashandra C. Govender, Cookie	Organisations face productivity and efficiency challenges brought on by global pressure. To cope with the challenges, they seek to develop and enhance their human capital as a source of sustainable competitive advantage. Evidence suggests that less than 10% of what is learned on training courses is applied effectively to enhance performance and business results.	Approach to overcome challenges	Productivity and efficiency challenges can be outperformed by training huamn capital as a source of sustainable competitive advantage to enhance performance and business results	Challenges overcome with the help of training to enhance performance and business results	Benefits of training and education	Benefits of training and education	Importance of training framework	Effectiveness of training	Framework of Training	FOT
19	Jasson, Cashandra C. Govender, Cookie	Smart investment in scarce and critical skills development by means of training is expected to enhance human capital; however, the challenge lies with the uncertainty in whether the return on these investments are measured and whether training risks are managed.	Approach to overcome challenges	Productivity and efficiency challenges can be outperformed by training huamn capital as a source of sustainable competitive advantage to enhance performance and business results	Challenges overcome with the help of training to enhance performance and business results	Benefits of training and education	Benefits of training and education	Importance of training framework	Effectiveness of training	Framework of Training	FOT
20	Jasson, Cashandra C. Govender, Cookie	Training and line managers must note that although the evaluation of trainee's satisfaction, learning, application, impact and financial return is imperative and must be measured, ignoring the measurement of risk factors such as learning barriers and challenges may jeopardise the ability of leaders and managers to predict how investments in human capital development will impact business results.	Factors affecting training	Training and line managers must anticipate factors to predict how investments in human capital development will impact business results	Challenges overcome with the help of training to enhance performance and business results	Benefits of training and education	Benefits of training and education	Importance of training framework	Effectiveness of training	Framework of Training	FOT

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21	Lambe, Patrick	Patrick Lambe provided a brief background on the economics of e-learning. He looks at some of the most common ways that organizations deploy e-learning to support their strategic objectives and shows how measurement of viability and impact can be approached within those situations.	Approach to overcome challenges	E-learning to support strategic objectives to measure viability and impact approached on those situations	Education support strategic objective by training	Benefits of training and education	Benefits of training and education	Importance of training framework	Effectiveness of training	Framework of Training	FOT
22	Lambert, Peter De Schrijver, Davy Van Deursen, Davy De Neve, Wesley Dhondt, Yves Van De Walle, Rik	The results of a series of tests indicate that the ROI extraction process significantly reduces the bit rate of the bitstreams and increases the decoding speed. In case of a fixed camera and a static background, the impact of this reduction on the visual quality of the video sequence is negligible. Regarding the adaptation framework itself, it is shown that in all cases, the framework operates in real time and that it is suited for streaming scenarios by design.	Framework of ROI	ROI process is more effective and impactful, framework operates in real time.	ROI changes the framework from usual to sustainable	ROI methodology helping in the fields of sustainable development	ROI methodology helping in the fields of sustainable development	Effectiveness of ROI framework	CALCULATION OF COST OF TRAINING	Return on Investment	ROI
23	Lynch, Kara Akridge, Jay T. Schaffer, Scott P. Gray, Allan	Return on Investment (ROI) is a financial metric that can be used to evaluate training and development investments. The objective of this research is to develop an evaluation process using ROI to assess the financial performance of management development programs.	Basics of ROI	ROI used to evaluate training and development investments, helps to assess the financial performance of management developed programs	Evaluation of training and development investment	Benefits of training and education	ROI methodology offers a practical way (to ROI on investment methodology)	Effectiveness of ROI framework	ROI Methodology	Framework of Training	FOT
24	Lynch, Kara Akridge, Jay T. Schaffer, Scott P. Gray, Allan	A three-phase model for ROI evaluation is presented. These phases include assessment planning, data collection, and data analysis. This model is then tested and applied to a management development program.	ROI evaluation	Phillips model of ROI for determining the Return on Investment in human resource development	Model to determine ROI in HRD	Preliminary requirement to invest in training in an organization	ROI methodology offers a practical way (to ROI on investment methodology)	Effectiveness of ROI framework	ROI Methodology	Return on Investment	ROI

Sr. No:	Authors	Transcript	Description	Preliminary Thoughts	Open Code	Initial Category	Refined Category	Sub-themes	Themes	Concept	Concept Code
25	Lynch, Kara Akridge, Jay T. Schaffer, Scott P. Gray, Allan	The first phase of this model is assessment planning. This preparatory phase defines the program objectives, states the purpose of the evaluation, determines the types of benefits to be measured, determines the method of data collection, and establishes the timing for the evaluation.	ROI evaluation	First phase includes evaluation instruments to collect data by means of evaluation timing, evaluation purpose and evaluation levels.	Evaluation of training and development investment	ROI methodology offers a practical way (to ROI on investment methodology)	Cost and benefit of ROI	Effectiveness of ROI framework	CALCULATION OF COST OF TRAINING	Return on Investment	ROI
26	Lynch, Kara Akridge, Jay T. Schaffer, Scott P. Gray, Allan	The second phase of the model is data collection. This phase includes determining the costs of the program and collecting the benefits data. The first step of the data collection is to determine the costs of the training program. For every program, there are three types of costs: known/invoice costs, other known costs, and other/estimated additional costs. The effects of this phase are also taken into consideration by isolating them. For example: Employee wages are not considered in this analysis. This may be a controversial decision because when the client is a company, the company is paying to have their employees trained; therefore the company is losing productive work time. But if the employees are not trained, then the organization is compromising the quality of the employee and forfeiting future gains from the training program.	ROI evaluation	Second phase includes isolating the effects of the data collected to determine the cost of training. Three costs of training are determined for each program.	Isolating effects of data collected to determine cost of training programs	ROI methodology offers a practical way (to ROI on investment methodology)	Cost and benefit of ROI	Isolate effect of training	CALCULATION OF COST OF TRAINING	Return on Investment	ROI

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27	Lynch, Kara Akridge, Jay T. Schaffer, Scott P. Gray, Allan	Phase III of this model includes evaluating the data and communicating and reporting the results. Determining costs is usually straightforward. To determine the benefits, it is necessary to convert the qualitative data into monetary values. The benefit figures from all sources are then totaled. The ROI is then calculated using the simple financial ratio.	ROI evaluation	Third phase includes converting the qualitative data into monetary values by identifying intangible benefits. Once all the costs are tabulated, ROI can be calculated using simple financial ratio that is cost to benefit.	Converting the qualitative data into monetary value, after which ROI can be calculated	Identifying intangible benefits help in converting data into monetary value	Cost and benefit of ROI	Training budget (keeping in mind the cost and benefit analysis)	CALCULATION OF BENEFIT OF TRAINING	Return on Investment	ROI
28	Lynch, Kara Akridge, Jay T. Schaffer, Scott P. Gray, Allan	The components identified for the benefits of the AMP program include both quantitative and qualitative data. The components of quantitative data are in the categories of output and time; the components of qualitative data are in the categories of new/improved skills, feelings and attitudes, work climate, and initiative. Output is focused on tasks completed and time is focused on efficiency. New/improved skills focus on concepts and skills of the program. Work climate relates to teamwork and relationships with colleagues, feelings and attitudes relates to perceived changes in performance, and initiative relates to the implementation of new ideas.	AMP program	The qualitative and quantitative benefits are evaluated, quantitative data embraces time saving, error reduction, etc. Whereas, qualitative data are hard to measure and transfer into monetary values.	Phillips's ROI framework includes techniques used to evaluate the effectiveness of training programs.	Benefits evaluated to measure the effectiveness of programs	Cost and benefit of ROI	Training budget (keeping in mind the cost and benefit analysis)	CALCULATION OF BENEFIT OF TRAINING	Return on Investment	ROI
29	Mattson, Brent W.	The problem and the solution. It has been shown that managers prefer results-type evaluation when making decisions about how to invest in human resource development (HRD) activities.	ROI evaluation	Managers prefer results-type evaluation when making decisions about how to invest in human resource development (HRD) activities.	Result type evaluation necessary to invest in HRD activities	Preliminary requirement to invest in training in an organization	Importance of comprehensive plan for corporate training	REQUIREMENT FRAMEWORK OF TRAINING	CALCULATION OF COST OF TRAINING	Framework of Training	FOT

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30	McDonagh, Mary	A mixed methods approach was used with a view that it would provide a more in depth valuation. The ROI and BCR formulas which are key metrics in the Phillips model were used to calculate the tangible benefits of the training. Semi-structured interviews were conducted with members of the management team to establish if there had been intangible benefits from the training at an organisational level. This evaluation confirmed that QFA training did have a positive impact on organisational performance in the credit union.	Impact of training	A significant consideration given to the incorporation of the intangible and qualitative benefits of simulation-based training in health care.	A methodology documented in several books by to monetize various training approaches, and a traditional return on investment methodology	ROI methodology offers a practical way (to ROI on investment methodology)	ROI methodology offers a practical way (to ROI on investment methodology)	Effectiveness of ROI framework	ROI Methodology	Return on Investment	ROI
31	Medina, L. Acosta-Pérez, E. Velez, C. Martínez, G. Rivera, M. Sardiñas, L. Pattatucci, A.	The goal of the Office Community Research and Engagement (OCRE) of the Puerto Rico Clinical and Translational Research Consortium (PRCTRC) is to establish a stable and sustainable translational research capacity. Early efforts toward achieving this goal included sponsoring two independent research training programs.	Evaluation of training programme	Goal of OCRE and PRCTRC to establish a stable and sustainable translational research.	ROI changes the framework from usual to sustainable	Aims of training towards evaluating and changing organizational structure	Aims of training towards evaluating and changing organizational structure	REQUIREMENT FRAMEWORK OF TRAINING	Effectiveness of training	Framework of Training	FOT

Sr. No:	Authors	Transcript	Description	Preliminary Thoughts	Open Code	Initial Category	Refined Category	Sub-themes	Themes	Concept	Concept Code
32	Medina, L. Acosta-Pérez, E. Velez, C. Martínez, G. Rivera, M.Sardiñas, L. Pattatucci, A.	A description of the implementation of the five step Success Case Method is presented. Results reveal that SCM would deem both trainings as highly successful, based upon the overall impact of a low number of success cases. However, a traditional summative evaluation would consider this disappointing. Strengths of SCM are discussed. It was concluded that the Success Case Method is a useful and valuable evaluative method for measuring the success of health promotion and public health training initiatives and provides sufficient information for decision-making processes.	Evaluation of training programme	E-learning to support strategic objectives to measure viability and impact approached on those situations	ROI changes the framework from usual to sustainable	Comprehensive plan is essential while measuring outcomes in corporate training	Importance of comprehensive plan for corporate training	REQUIREMENT FRAMEWORK OF TRAINING	Effectiveness of training	Framework of Training	FOT
33	Mohamed, A. Rasli, A. Mansor, N.N. Abu	In increasing markets and economy, human capital investments have evolved as a result of intense competition, rapid growth and change, colliding cultures, technology waves and more, that occurs at unprecedented speeds. The interest and purpose of this research is due to Malaysian Government worries on Government Linked Companies (GLCs) and to assist the Malaysian Government as in the 9th Malaysian Plan, to focus on the National Mission to achieve Vision 2020 through one of the priority areas, human capital development.	Human capital investments	Training and line managers must anticipate factors to predict how investments in human capital development will impact business results	Challenges overcome with the help of training to enhance performance and business results	Benefits of training and education	Benefits of training and education	Importance of training framework	Effectiveness of training	Framework of Training	FOT

Sr. No:	Authors	Transcript	Description	Preliminary Thoughts	Open Code	Initial Category	Refined Category	Sub-themes	Themes	Concept	Concept Code
34	Mohamed, A. Rasli, A. Mansor, N.N. Abu	The review of training evaluation literature on the factors contributing to the implementation of evaluation on business impacts (BI) and ROI for soft skills training in Malaysian GLCs. The proposed contribution factors to be discussed are organisational policy, organisational resources and organisational culture.	ROI evaluation	Productivity and efficiency challenges can be outperformed by training huamn capital as a source of sustainable competitive advantage to enhance performance and business results	Challenges overcome with the help of training to enhance performance and business results	Benefits of training and education	Benefits of training and education	Importance of training framework	Effectiveness of training	Framework of Training	FOT
35	Phillips, Jack J Phillips, Patti P	Understanding the drivers for the ROI process and the inherent weaknesses and advantages of ROI makes it possible to take a rational approach to the issue and implement an appropriate mix of evaluation strategies. One thing is certain-ROI is not a fad. The concept of ROI has been used for centuries. The 75th anniversary issue of Harvard Business Review (HBR) traced the tools used to measure results in organizations. 1 During the 1920s, ROI was the emerging tool to place a value on the payoff of investments	ROI processes	Productivity and efficiency challenges can be outperformed by training huamn capital as a source of sustainable competitive advantage to enhance performance and business results	Challenges overcome with the help of training to enhance performance and business results	Benefits of training and education	Benefits of training and education	Importance of training framework	Effectiveness of training	Framework of Training	FOT

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36	Phillips, Jack J Phillips, Patti P	In recent years, the application of the concept has been expanded to all types of investments including human resources, training and education, change initiatives, and technology. Today, hundreds of organizations are developing ROI calculations for many of these programs. Three casebooks have been developed to show specific applications. 2 3 Another is being developed for the public sector, sponsored in part by the International Personnel Management Association.	Types of investment	A significant consideration given to the incorporation of the intangible and qualitative benefits of simulation-based training in health care.	A methodology documented in several books by to monetize various training approaches, and a traditional return on investment methodology	ROI methodology offers a practical way (to ROI on investment methodology)	ROI methodology offers a practical way (to ROI on investment methodology)	Effectiveness of ROI framework	ROI Methodology	Return on Investment	ROI
37	Phillips, Jack J Phillips, Patti P	As long as there is a need for accountability of expenditures and the concept of an investment payoff is desired, the ROI will be used to evaluate major investments, including HR. Approaches to HR Accountability Fortunately, the HR profession has made much progress with measurement and evaluation. Since the 1960s, several measurement schemes have been used and the approaches have changed over time. Figure 1 illustrates the approximate timeline for different measurement approaches.	ROI processes	As long as there is a need for accountability of expenditures and the concept of an investment payoff is desired, the ROI will be used to evaluate major investments.	ROI methodology offers a practical way to forecast the potential payoff before funds are committed	ROI methodology offers a practical way (to forecast the potential payoff)	ROI methodology offers a practical way (to forecast the potential payoff)	Effectiveness of ROI framework	CALCULATION OF COST OF TRAINING	Return on Investment	ROI

Sr. No:	Authors	Transcript	Description	Preliminary Thoughts	Open Code	Initial Category	Refined Category	Sub-themes	Themes	Concept	Concept Code
38	Phillips, Jack J Phillips, Patti P	Few would argue that the human resources function should not be measured, but determining the right approach is a significant challenge. Twelve different approaches are identified and briefly described next. While each one is presented separately, there is often overlap in the techniques, processes, and focus of some approaches. Early Approaches to Measurement The early approaches have been refined over the years and usually focus on subjective measures or easy to implement strategies. While still being used by many organizations, other approaches are also being incorporated into the measurement mix as organizations continue to improve measurement processes.	Approach to overcome challenges	The early approaches have been refined over the years and usually focus on subjective measures or easy to implement strategies.	A methodology documented in several books by to monetize various training approaches, and a traditional return on investment methodology	ROI methodology offers a practical way (to ROI on investment methodology)	ROI methodology offers a practical way (to ROI on investment methodology)	Effectiveness of ROI framework	ROI Methodology	Return on Investment	ROI
39	Russ-Eft, Darlene Preskill, Hallie	Much of the human resource development (HRD) evaluation literature focuses on the Kirkpatrick four-level approach and emphasizes the importance of measuring the return on investment (ROI) of HRD initiatives or programs. This article argues that, in many cases, ROI does not provide the kind of information needed by decision makers. What is needed is a systems model that examines the effect of organizational and environmental factors on the intended outcomes of an HRD initiative or program. Such a model can help to frame any	Human capital investments	Managers prefer results-type evaluation when making decisions about how to invest in human resource development (HRD) activities.	Result type evaluation necessary to invest in HRD activities	Preliminary requirement to invest in training in an organization	Importance of comprehensive plan for corporate training	REQUIREMENT FRAMEWORK OF TRAINING	CALCULATION OF COST OF TRAINING	Framework of Training	FOT

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		evaluation, including one that focuses on ROI.									
40	Spitzer, Dean R.	How to achieve organisational impact through the use of learning interventions is one of the primary difficulties facing human resource development. Even those who advocate for results-oriented assessments in practice tend to fall back on low-level (attendance, satisfaction, and learning) indicators.	Approach to overcome challenges	The major challenges facing human resource development in using learning interventions to organisational result is to achieve results-oriented measurements beyond low-level (attendance, satisfaction, and learning) measures in actual practice	Result type evaluation necessary to invest in HRD activities	Preliminary requirement to invest in training in an organization	Importance of comprehensive plan for corporate training	REQUIREMENT FRAMEWORK OF TRAINING	CALCULATION OF COST OF TRAINING	Framework of Training	FOT
41	Spitzer, Dean R.	The Learning Effectiveness Measurement (LEM) technique was designed to solve the challenge of providing a reliable results-oriented learning measurement that would not only help evaluate but also raise the effectiveness of learning interventions. The article begins by highlighting some of the major shortcomings of existing learning effectiveness methodologies, then goes on to describe the LEM methodology in depth, present an example of LEM in action, and conclude by demonstrating how LEM addresses the constraints mentioned at the outset.	LEM methodology	Training human capital increases Productivity and efficiency and builds sustainable competitive advantage presents to achieve reliable results-oriented learning.	Challenges overcome with the help of training to enhance performance and business results	Benefits of training and education	Benefits of training and education	Importance of training framework	Effectiveness of training	Framework of Training	FOT
42	Suresh Vishwakarma, Ruchi, Tyagi	The Indian power distribution companies (DISCOMs) adopted new technologies and commercial practices. The present study identifies the competency areas in which frontline managers (FLMs) need training in the Indian	Training process at DISCOM	Need for institutionalizing training process at DISCOMs and training needs assessment should be given prior importance for FLMs' competency.	Training process at DISCOMs and training needs assessment	Benefits of training and education	Need for institutionalizing training process at DISCOM	Importance of training framework	Effectiveness of training	Framework of Training	FOT

Sr. No:	Authors	Transcript	Description	Preliminary Thoughts	Open Code	Initial Category	Refined Category	Sub-themes	Themes	Concept	Concept Code
		power distribution sector. There is a need for institutionalizing training process at DISCOMs and training needs assessment should be given prior importance for FLMs' competency.									
43	Teixeira, Cláudia. Pereira, Leandro.	This paper intends to provide a deeper understanding about the current ROI in Training practices applied in organizations. Although the well advanced practices on how to estimate and measure business initiatives benefits, it is still an uncommon practice to apply this knowledge and methodologies on HR initiatives, in particular, training programs.	ROI in training practices	The advanced practices on how to estimate and measure business initiatives benefits, is still an uncommon practice to apply knowledge and methodologies on HR initiatives, in particular, training programs.	Challenges overcome with the help of training to enhance performance and business results	ROI methodology offers a practical way (to ROI on investment methodology)	ROI methodology offers a practical way (to ROI on investment methodology)	Effectiveness of ROI framework	ROI Methodology	Return on Investment	ROI
44	Teixeira, Cláudia. Pereira, Leandro.	The ability to keep a business sustainable in such a current globalized world, hugely comes from the human capital in organizations, or in other words, from the dynamic competences owned by the company teams. For this reason, the investment in professional training is increasing hence the need on assuring that the right training programs are implemented and contributing to the business goals.	Investment in training	E-learning to support strategic objectives to measure viability and impact approached on those situations	ROI changes the framework from usual to sustainable	Comprehensive plan is essential while measuring outcomes in corporate training	Importance of comprehensive plan for corporate training	Importance of training framework	ROI Methodology	Framework of Training	FOT

Sr. No:	Authors	Transcript	Description	Preliminary Thoughts	Open Code	Initial Category	Refined Category	Sub-themes	Themes	Concept	Concept Code
45	Teixeira, Cláudia. Pereira, Leandro.	Knowing how to measure the ROI in Training is becoming a critical skill for HR Executives as they need to justify whether that investment was effective, or in other words, whether there was any return generated with the training programs to their organization employees and ultimately to the business goals. This paper presents the main results from a research about the current ROI in Training practices used by organizations, where it was possible to conclude that level 1 and 2 (reaction and learning evaluation) is frequently used, however the remaining levels (Impact, Application and ROI analysis) are often neglected.	ROI in training practices	To measure the ROI in Training is becoming a critical skill for HR Executives as they need to justify whether that investment was effective.	The comprehensive planning is essential when company has limited resources and needs are vast	Comprehensive plan is essential while measuring outcomes in coporate training	Importance of comprehensive plan for corporate training	Isolate effect of training	Effectiveness of training	Framework of Training	FOT
46	Varghese, K X Manoj, P K	The insurance sector has been playing a crucial role in the process of economic development since independence in India. The global market for training expenditures in 2011 was about \$287B. Training is a key strategic element in many organizations and can be an important cost consideration for the leaders of all organizations. Measuring the return on investment of training projects is a capable approach to show top administration the benefit of training interests in money related terms.	Importance of training	To measure the ROI in Training is becoming a critical skill for HR Executives as they need to justify whether that investment was effective.	The comprehensive planning is essential when company has limited resources and needs are vast	Comprehensive plan is essential while measuring outcomes in coporate training	Importance of comprehensive plan for corporate training	Isolate effect of training	Effectiveness of training	Framework of Training	FOT

Sr. No:	Authors	Transcript	Description	Preliminary Thoughts	Open Code	Initial Category	Refined Category	Sub-themes	Themes	Concept	Concept Code
47	Varghese, K X Manoj, P K	The main objective of the study is to measure the return on investments (ROI) of training programmes in insurance sector of India. ROI Model developed by Phillips, Jack for calculated Return on investment is used for the present study. For this author took top 4 insurance companies of India as sample. ROIs of sampled companies are calculated for 7 years. Secondary data are used for the study. Results showed that there is a huge difference in the Return on investments of training programmes between life and non-life companies, and private and public sector companies.	ROI in training practices	To measure the ROI in Training is becoming a critical skill for HR Executives as they need to justify whether that investment was effective.	The comprehensive planning is essential when company has limited resources and needs are vast	Comprehensive plan is essential while measuring outcomes in corporate training	Importance of comprehensive plan for corporate training	Measure ROI framework	Effectiveness of training	Framework of Training	FOT
48	World Bank	It has long been claimed that rural electrification greatly improves the quality of life. Lighting alone brings benefits such as increased study time and improved study environment for school children, extended hours for small businesses, and greater security.	Importance of rural electrification	Rural electrification is an asset for quality of life, it brings several benefits for learning and business	RE benefits learning and business	Benefits of training and education	Importance of comprehensive plan for corporate training	Rural Electrification training in DISCOMs	Effectiveness of training	Framework of Training	FOT

Sr. No:	Authors	Transcript	Description	Preliminary Thoughts	Open Code	Initial Category	Refined Category	Sub-themes	Themes	Concept	Concept Code
49	Dixon-Woods, Mary	Framework analysis is a technique used for data analysis in primary qualitative research. Recent years have seen its being adapted to conduct syntheses of qualitative studies. Framework-based synthesis shows considerable promise in addressing applied policy questions. An innovation in the approach, known as 'best fit' framework synthesis, has been published in BMC Medical Research Methodology this month. It involves reviewers in choosing a conceptual model likely to be suitable for the question of the review, and using it as the basis of their initial coding framework.	ROI Methodology	Framework-based synthesis shows considerable promise in addressing applied policy questions	ROI methodology offers a practical way to forecast the potential payoff before funds are committed	ROI methodology offers a practical way (to forecast the potential payoff)	ROI methodology offers a practical way (to forecast the potential payoff)	Training budget (keeping in mind the cost and benefit analysis)	CALCULATION OF COST OF TRAINING	Return on Investment	ROI
50	Bonello, Marjorie Meehan, Ben	This article describes and reflects on the analytical process undertaken on a qualitative case study analysis exploring the concept of interprofessional education (IPE) in Malta. The analysis which employed the 'Framework' approach executed by qualitative data analysis (QDAS) software, specifically NVivo, served to produce an audit trail eliciting how the data, findings, interpretations and subsequent conclusions were all tracked and grounded in the raw data.	ROI Tools	The analysis which employed the 'Framework' approach executed by qualitative data analysis (QDAS) software, specifically NVivo,	ROI forecasting tool allows organizations to quickly develop and examine the business case for investing.	ROI methodology offers a practical way (to develop & examine business care)	ROI methodology offers a practical way (to develop & examine business care)	Training budget (keeping in mind the cost and benefit analysis)	ROI Methodology	Return on Investment	ROI

Sr. No:	Authors	Transcript	Description	Preliminary Thoughts	Open Code	Initial Category	Refined Category	Sub-themes	Themes	Concept	Concept Code
51	Alagh, Yoginder	Adequate investment in capacity and efficient working of transmission and distribution systems in developing economies with high growth of electricity demand are important objectives. Market oriented reform processes are required both for the creation of capacity and for electricity as a product	Training plan	Market oriented reform processes are required both for the creation of capacity and for electricity as a product	The comprehensive planning is essential when company has limited resources and needs are vast	Comprehensive plan is essential while measuring outcomes in corporate training	Importance of comprehensive plan for corporate training	Isolate effect of training	Effectiveness of training	Framework of Training	FOT
52	Shenton, Andrew K.	Although many critics are reluctant to accept the trustworthiness of qualitative research, frameworks for ensuring rigour in this form of work have been in existence for many years. Guba's constructs, in particular, have won considerable favour and form the focus of this paper. Here researchers seek to satisfy four criteria. In addressing credibility, investigators attempt to demonstrate that a true picture of the phenomenon under scrutiny is being presented.	ROI of training	critics are reluctant to accept the trustworthiness of qualitative research, frameworks for ensuring rigour in this form of work have been in existence for many years.	The comprehensive planning is essential when company has limited resources and needs are vast	Comprehensive plan is essential while measuring outcomes in corporate training	Importance of comprehensive plan for corporate training	Importance of training framework	Effectiveness of training	Framework of Training	FOT
53	Rosenthal, Joshua Quinn, Ashlinn Grieshop, Andrew P .Pillarsetti, Ajay Glass, Roger I.	Development and implementation of clean cooking technology for households in low and middle income countries (LMICs) offer enormous promise to advance at least five Sustainable Development Goals (SDGs): 3. Good health and well-being; 5. Gender equality; 7. Affordable and clean energy; 13. Climate action; 15. Life on land.	Framework of ROI	Development and implementation of clean cooking technology for households in low and middle income countries (LMICs) offer enormous promise to advance at least five Sustainable Development Goals	A methodology documented in several books by to monetize various training approaches, and a traditional return on investment methodology	ROI methodology offers a practical way (to ROI on investment methodology)	ROI methodology offers a practical way (to ROI on investment methodology)	Measure ROI framework	ROI Methodology	Return on Investment	ROI

Sr. No:	Authors	Transcript	Description	Preliminary Thoughts	Open Code	Initial Category	Refined Category	Sub-themes	Themes	Concept	Concept Code
54	Rosenthal, Joshua Quinn, Ashlinn Grieshop, Andrew P Pillariseti, Ajay Glass, Roger I.	Programs are being implemented around the world to introduce alternative cooking technologies, and we are well on the way to achieving the goal set by the Global Alliance for Clean Cookstoves to reach 100 million homes with cleaner and more efficient cooking methods by 2020.	Benefits of training	Programs are being implemented around the world to introduce alternative cooking technologies	Benefits incorporated in the framework that has been developed to monetize real value of training	Benefits evaluated to measure the effectiveness of programs	Cost and benefit of ROI	Training budget (keeping in mind the cost and benefit analysis)	CALCULATION OF BENEFIT OF TRAINING	Return on Investment	ROI
55	Rosenthal, Joshua Quinn, Ashlinn Grieshop, Andrew P Pillariseti, Ajay Glass, Roger I.	Cost and infrastructure requirements for clean fuels such as LPG are widely recognized constraints. In view of these constraints we present an analytical method to simultaneously consider health and climate needs at the national level for the same 40 countries in the context of estimated LPG expansion potentials. Comparative analyses integrating priorities across SDGs at the national and regional levels may guide more practical and effective household energy development choices going forward.	VMM	Comparative analyses integrating priorities across SDGs at the national and regional levels may guide more practical and effective household energy development choices going forward.	Framework adapted to create an integrated methodology that can be readily implemented	Benefits evaluated to measure the effectiveness of programs	Cost and benefit of ROI	Training budget (keeping in mind the cost and benefit analysis)	CALCULATION OF BENEFIT OF TRAINING	Framework of Training	FOT
56	Nirula, Ajai	The Indian power sector value chain can be broadly segmented into generation, transmission, and distribution sectors. The distribution sector consists of Power Distribution Companies (Discoms) responsible for the supply and distribution of energy to the consumers (industry, commercial, agriculture, domestic etc.). This sector is the weakest link in terms of financial and operational sustainability.	Approach to overcome challenges	The distribution sector consists of Power Distribution Companies (Discoms) responsible for the supply and distribution of energy to the consumers	Approaches and methods of organizations active in the field of sustainable development	ROI methodology helping in the fields of sustainable development	ROI methodology helping in the fields of sustainable development	Effectiveness of ROI framework	ROI Methodology	Return on Investment	ROI

Sr. No:	Authors	Transcript	Description	Preliminary Thoughts	Open Code	Initial Category	Refined Category	Sub-themes	Themes	Concept	Concept Code
57	Nirula, Ajai	Power distribution companies collect payments from consumers against their energy supplies (purchased from generators) to provide necessary cash flows to the generation and transmission sectors to operate. Due to the perennial cash collection shortfall, often due to payment delays from consumers, Discoms are unable to make timely payments for their energy purchases from the generators.	Approach to overcome challenges	Discoms are unable to make timely payments for their energy purchases from the generators.	Approaches and methods of organizations active in the field of sustainable development	Approaches for different steps to learn SDGs and make operationalization in practice	Training to put Sustainable development goals in practice	Effectiveness of ROI framework	Effectiveness of training	Framework of Training	FOT
58	Nirula, Ajai	As the data on distribution sector financials and operations shows, the power sector today faces the critical challenge of avoiding a financial crisis. In all likelihood, another scheme to address the shortfall of UDAY's targets, is on the horizon. The objective of this paper is to critically analyse the performance of Discoms in the context of UDAY, launched by the Government of India almost four years ago, for the operational and financial turnaround of the Discoms	Evaluation of training programme	the power sector today faces the critical challenge of avoiding a financial crisis.	Aims of training are concerned with change in the employee behaviour and the change needed in the organizational structure.	Aims of training towards evaluating and changing organizational structure	Aims of training towards evaluating and changing organizational structure	Importance of training framework	Effectiveness of training	Framework of Training	FOT
59	Mohammad, Soraya	The demonstration of effectiveness by evaluating the behaviour change in practice is something that is new for most organisations. Therefore organisations might adjust their current way of working concerning the evaluation on the effectiveness of training programs(Aggestam, 2006).	Training processes	organisations might adjust their current way of working concerning the evaluation on the effectiveness of training programs	Aims of training are concerned with change in the employee behaviour and the change needed in the organizational structure.	Aims of training towards evaluating and changing organizational structure	Aims of training towards evaluating and changing organizational structure	Importance of training framework	Effectiveness of training	Framework of Training	FOT

Sr. No:	Authors	Transcript	Description	Preliminary Thoughts	Open Code	Initial Category	Refined Category	Sub-themes	Themes	Concept	Concept Code
60	Vincent Rubino	Training effectiveness is challenging to measure. Intuition or judgment is commonly applied to examine the problems and opportunities associated with employee learning. This two-part article proposes an approach using data-driven insights from standard quality culture and performance metrics, with CoPQ calculations, to measure training ROI.	Evaluation of training programme	Intuition or judgment is commonly applied to examine the problems and opportunities associated with employee learning.	Aims of training are concerned with change in the employee behaviour and the change needed in the organizational structure.	Aims of training towards evaluating and changing organizational structure	Aims of training towards evaluating and changing organizational structure	Importance of training framework	Effectiveness of training	Framework of Training	FOT
61	Vincent Rubino	A training program cannot replace formal education for basic science and language skills necessary in the GMP workplace. A training program supports, but cannot replace, operation procedures written by experts. As such, primary purposes of training are to provide a positive influence on company culture, maximize performance potential, and ensure workplace integrity. However, even though a training program exists, culture indicators may not be established or measured.	Benefits of training	A training program supports, but cannot replace, operation procedures written by experts	Benefits of training and education to improvise training to get the job done	Benefits of training and education	Benefits of training and education	Importance of training framework	Effectiveness of training	Framework of Training	FOT

Sr. No:	Authors	Transcript	Description	Preliminary Thoughts	Open Code	Initial Category	Refined Category	Sub-themes	Themes	Concept	Concept Code
62	Vincent Rubino	Measured improvements using the example metrics described in Table 1 correspond with reductions in deviations, lot release delays, and other unwanted events. When supported by favorable Kirkpatrick training metric results, any cost savings (recoverable revenue) associated with reduction of CoPQ values are added together to determine the monetary benefit of training. Any losses are subtracted from the cost savings value.	NIU advancements in training programs	When supported by favorable Kirkpatrick training metric results, any cost savings associated with reduction of CoPQ values are added together to determine the monetary benefit of training	Universities including various program to improvise training to get the job done	Benefits of training and education	Benefits of training and education	Importance of training framework	Effectiveness of training	Framework of Training	FOT
63	Vincent Rubino	Performance metrics can help achieve organizational growth and change. The ROI plan illustrates the relationship of business objectives to goals and provides an approach to measure progress. If the plan includes methods to reward achievement and share the results for all to see, it has a better chance of improving quality culture and productivity and moving the organization toward business goals.	Importance of training	The ROI plan illustrates the relationship of business objectives to goals and provides an approach to measure progress.	Universities including various program to improvise training to get the job done	Benefits of training and education	Benefits of training and education	Importance of training framework	Effectiveness of training	Framework of Training	FOT
64	Vincent Rubino	A GMP training program is typically focused on compliance with regulatory expectations. While compliance is important, the reason behind the regulatory requirement is where the true value of the training program exists. A high-value GMP training program prevents poor quality in products and services and leads to improved employee and customer satisfaction.	Factors affecting training	A high-value GMP training program prevents poor quality in products and services and leads to improved employee and customer satisfaction.	Benefits of training and education to improvise training to get the job done	Benefits of training and education	Benefits of training and education	Importance of training framework	Effectiveness of training	Framework of Training	FOT

Sr. No:	Authors	Transcript	Description	Preliminary Thoughts	Open Code	Initial Category	Refined Category	Sub-themes	Themes	Concept	Concept Code
65	Vincent Rubino	A design to align the training program to business values in order to manage outcomes can be challenging. The ISPE Quality Metrics Initiative offers predefined quality and business outcomes, with metrics, which can be used as a design tool to establish a framework for calculating and managing training effectiveness.	Factors affecting training	The ISPE Quality Metrics Initiative offers predefined quality and business outcomes	The comprehensive planning is essential when company has limited resources and needs are vast	Comprehensive plan is essential while measuring outcomes in corporate training	Importance of comprehensive plan for corporate training	Isolate effect of training	Effectiveness of training	Framework of Training	FOT
66	Vincent Rubino	The training program efforts should align with the manufacturing/service business goals of increasing business productivity and capabilities, reducing costs, ensuring employees are satisfied and engaged, ensuring opportunities to build the business are achievable, and ensuring customer requirements are met. Establishing the ROI for training effectiveness can demonstrate the actual value of the learning that is delivered.	Approach to overcome challenges	the ROI for training effectiveness can demonstrate the actual value of the learning that is delivered.	Challenges overcome with the help of training to enhance performance and business results	Benefits of training and education	Benefits of training and education	Importance of training framework	Effectiveness of training	Framework of Training	FOT
67	Huselid, Mark A. Becker, Brian E.	The potential strategic impact of high performance work systems is consistent with a new focus in the literature on behavioral strategies that rely on core competencies and capabilities as sources of competitive advantage, not only because they provide the most effective response to market demands, but also because they are not easily copied by competitors	Approach to overcome challenges	The potential strategic impact of high performance work systems is consistent with a new focus in the literature on behavioral strategies that rely on core competencies and capabilities as sources of competitive advantage	Challenges overcome with the help of training to enhance performance and business results	Benefits of training and education	Benefits of training and education	Importance of training framework	Effectiveness of training	Framework of Training	FOT

Sr. No:	Authors	Transcript	Description	Preliminary Thoughts	Open Code	Initial Category	Refined Category	Sub-themes	Themes	Concept	Concept Code
68	Bartel, Ann P.	Three components of the literature on measuring the employer's rate of return to investments in employee training are reviewed: (1) studies that use large samples of firm-level or establishment-level data collected through mail or phone surveys, (2) studies that use data from one or two companies to conduct an "econometric" case study, and (3) company-sponsored case studies. The strengths and weaknesses of each of these approaches are evaluated and the estimated returns on investments (ROIs) are compared.	Factors affecting training	The strengths and weaknesses of each of three approaches are evaluated and the estimated returns on investments (ROIs) are compared.	Challenges overcome with the help of training to enhance performance and business results	Benefits of training and education	Benefits of training and education	Importance of training framework	Effectiveness of training	Framework of Training	FOT
69	Olatomiwa, Lanre Mekhilef, Saad Huda, A. S.N. Ohunakin, Olanyinka S.	Rural electrification improves the quality of life of rural dwellers having limited or non-access to electricity through decentralized electricity coverage. Since the price of oil is unstable and fluctuating day by day and grid expansion is not also a cost effective solution, integrating renewable energy sources thus become an important alternative for rural electrification. The present study investigated the feasibility of different power generation configurations comprising solar array, wind turbine and diesel generator in different locations within the geo-political zones of Nigeria.	Approach to overcome challenges	the price of oil is unstable and fluctuating day by day and grid expansion is not also a cost effective solution, integrating renewable energy sources thus become an important alternative for rural electrification.	Education support strategic objective by training	Benefits of training and education	Benefits of training and education	Importance of training framework	Effectiveness of training	Framework of Training	FOT

Sr. No:	Authors	Transcript	Description	Preliminary Thoughts	Open Code	Initial Category	Refined Category	Sub-themes	Themes	Concept	Concept Code
70	Olatomiwa, Lanre Mekhilef, Saad Huda, A. S.N. Ohunakin, Olanyinka S.	Six rural communities were randomly chosen from each of the six geo-political zones in Nigeria with the intention that the results of the study could be replicated in other remote locations of the selected zones with similar terrains. HOMER (Hybrid Optimization Model for Electric Renewable) simulation software was used to determine the economic feasibility of the systems.	Framework of ROI	HOMER (Hybrid Optimization Model for Electric Renewable) simulation software was used to determine the economic feasibility of the systems.	ROI changes the framework from usual to sustainable	ROI methodology helping in the fields of sustainable development	ROI methodology helping in the fields of sustainable development	Effectiveness of ROI framework	CALCULATION OF COST OF TRAINING	Return on Investment	ROI
71	Zhang, Wenyu Chen, Yan	Training is an important means to accumulate human resources and strengthen the core competitiveness of an enterprise. As the last step in training, the evaluation of training effectiveness has been the weak point in large number of enterprises for a long time. The evaluation method of skills training effectiveness based on cloud models is provided.	Basics of ROI	the evaluation of training effectiveness has been the weak point in large number of enterprises for a long time.	Evaluation of training and development investment	Benefits of training and education	ROI methodology offers a practical way (to ROI on investment methodology)	Effectiveness of ROI framework	ROI Methodology	Framework of Training	FOT
72	Schillebeeckx, Simon J.D. Parikh, Priti Bansal, Rahul George, Gerard	Rural electrification (RE) has gained prominence over the past two decades as an effective means for improving living conditions. This growth has largely been driven by socio-economic and political imperatives to improve rural livelihood and by technological innovation. Based on a content analysis of 232 scholarly articles, the literature is categorized into four focal lenses: technology, institutional, viability and user-centric. We find that the first two dominate the RE debate.	ROI evaluation	This growth in Rural electrification has largely been driven by socio-economic and political imperatives supported by technological innovation.	Model to determine ROI in HRD	Preliminary requirement to invest in training in an organization	ROI methodology offers a practical way (to ROI on investment methodology)	Effectiveness of ROI framework	ROI Methodology	Return on Investment	ROI

Sr. No:	Authors	Transcript	Description	Preliminary Thoughts	Open Code	Initial Category	Refined Category	Sub-themes	Themes	Concept	Concept Code
73	Schillebeeckx, Simon J.D. Parikh, Priti Bansal, Rahul George, Gerard	The viability lens has been utilised less frequently, while the user-centric lens has only recently (from 2007) begun to engage scholars. The paper gives an overview of the technological, institutional, and viability lenses before delving deeper into the user-centric lens. The paper combines the four lenses to create a business model framework that policymakers, practitioners, and investors can use to evaluate RE projects and plan future rural electrification efforts.	ROI evaluation	The paper provides an overview of the technological, institutional and viability lenses, and elaborate upon the user-centric lens in greater detail to evaluate rural electrification	Evaluation of training and development investment	ROI methodology offers a practical way (to ROI on investment methodology)	Cost and benefit of ROI	Effectiveness of ROI framework	CALCULATION OF COST OF TRAINING	Return on Investment	ROI
74	Bhattacharyya, Subhes C. Ohiare, Sanusi	The economic and infrastructural disparities between the rural and urban communities of most developing countries in general and the same disparity is prevailing in energy access. Countries like China had invested in rural electrification project with training and achieved a great feat of almost 100% electrification rate	ROI evaluation	The energy access disparities between the rural and urban communities is common and rural electrification investment with training is made to overcome the same	Isolating effects of data collected to determine cost of training programs	ROI methodology offers a practical way (to ROI on investment methodology)	Cost and benefit of ROI	Isolate effect of training	CALCULATION OF COST OF TRAINING	Return on Investment	ROI
75	Rajeev, P. Madan, M.S. Jayarajan, K.	In scientific and research organizations, the training needs facilitator roles and methods have undergone a change necessitated by rapid information and technology boom. There is ample evidence to show that evaluation and objective assessment of effectiveness and outcomes of training programmes being implemented by organizations are not given due importance	ROI evaluation	the training needs facilitator roles and methods have undergone a change necessitated by rapid information and technology boom.	Converting the qualitative data into monetary value, after which ROI can be calculated	Identifying intangible benefits help in converting data into monetary value	Cost and benefit of ROI	Training budget (keeping in mind the cost and benefit analysis)	CALCULATION OF BENEFIT OF TRAINING	Return on Investment	ROI

Sr. No:	Authors	Transcript	Description	Preliminary Thoughts	Open Code	Initial Category	Refined Category	Sub-themes	Themes	Concept	Concept Code
		as that of their planning and implementation.									
76	Rajeev, P. Madan, M.S. Jayarajan, K.	An attempt is made in this communication firstly to analyse the theories of training evaluation in general; the study also illustrates a case study of training evaluation of the academic training courses being carried out at the Indian Institute of Spices Research by revisiting the popular Kirkpatrick's model. The three-step evaluation model is a combination of formative and summative approaches using multiple methods which measure reactions, perceptions, learning and behavioural components of the trainees combining quantitative and qualitative tools and aims at assessing the usefulness of the course in providing an adequate learning climate.	AMP program	The three-step evaluation model is a combination of formative and summative approaches using multiple methods which measure reactions, perceptions, learning and behavioural components of the trainees	Phillips's ROI framework includes techniques used to evaluate the effectiveness of training programs.	Benefits evaluated to measure the effectiveness of programs	Cost and benefit of ROI	Training budget (keeping in mind the cost and benefit analysis)	CALCULATION OF BENEFIT OF TRAINING	Return on Investment	ROI

Sr. No:	Authors	Transcript	Description	Preliminary Thoughts	Open Code	Initial Category	Refined Category	Sub-themes	Themes	Concept	Concept Code
77	Gupta, Deepa Agarwal, Sugandha	Skill development, increasing the employability, placement etc had become the important areas of research and of prime importance for the Govt. of India to escape from the unemployment disaster that might happen due to more number of unskilled youth. Power, electricity as a prime source for any industry to run has more responsibility for smooth flow with knew tech-how and environment friendly.	ROI evaluation	Power, electricity as a prime source for any industry to run has more responsibility for smooth flow with knew tech-how and environment friendly.	Result type evaluation necessary to invest in HRD activities	Preliminary requirement to invest in training in an organization	Importance of comprehensive plan for corporate training	REQUIREMENT FRAMEWORK OF TRAINING	CALCULATION OF COST OF TRAINING	Framework of Training	FOT
78	Peters, Jörg Harsdorff, Marek Ziegler, Florian	It is commonly recognized among rural energy experts and development practitioners that electrification activities in rural areas of developing countries should be accompanied by complementary services. Nevertheless, rural electrification projects that confine themselves to hardware financing and civil works without undertaking escorting activities are observed frequently.	Impact of training	rural electrification projects that confine themselves to hardware financing	A methodology documented in several books by to monetize various training approaches, and a traditional return on investment methodology	ROI methodology offers a practical way (to ROI on investment methodology)	ROI methodology offers a practical way (to ROI on investment methodology)	Effectiveness of ROI framework	ROI Methodology	Return on Investment	ROI

Sr. No:	Authors	Transcript	Description	Preliminary Thoughts	Open Code	Initial Category	Refined Category	Sub-themes	Themes	Concept	Concept Code
79	Bagtasos, Maynard Rivalal	The Quality of Work Life (QWL) is a multi-faceted concept, having multi-dimensional constructs brought about by the variation of interest of the researchers and/or its users. The issue of QWL has become critical due to the increasing demands of today's business environment and of the family structure. This gave rise to an increased interest in training on. Evaluating training on QWL always involves the interplay between and among the worker, job content, and job context.	Evaluation of training programme	The issue of QWL has become critical due to the increasing demands of today's business environment and of the family structure. Evaluating training on QWL has high return on Investment.	ROI changes the framework from usual to sustainable	Aims of training towards evaluating and changing organizational structure	Aims of training towards evaluating and changing organizational structure	Requirement Framework Of Training	Effectiveness of training	Framework of Training	FOT
80	Bastakoti, Badri Prasad	Rural electrification has a variety of implications and applications for rural families and communities. The practical experience presented in this study demonstrates the efforts and approaches used to make the best use of electric energy by establishing businesses. Experience has shown that, beyond apparent uses for lighting, radios, and basic home appliances, uses that can bring economic development to an area are slow to arise if rural electrification is let to grow without any directing inputs. Electricity should be used to help a community develop. The training develops users to adopt more electricity in the way of life	Evaluation of training programme	The field experience drawn in this paper shows the efforts and approaches employed to make the optimum use of the electric energy through enterprise creation.	ROI changes the framework from usual to sustainable	Comprehensive plan is essential while measuring outcomes in corporate training	Importance of comprehensive plan for corporate training	Requirement Framework of Training	Effectiveness of training	Framework of Training	FOT
81	Rao, Prakash Kostecki, Robert Dale, Larry Gadgil, Ashok	The global demand for water and energy is projected to grow, but there likely will be significant constraints in our ability to keep meeting it.	Human capital investments	Energy is used to supply and treat water; moreover, emissions from energy generation contribute to climate	Challenges overcome with the help of training to enhance	Benefits of training and education	Benefits of training and education	Importance of training framework	Effectiveness of training	Framework of Training	FOT

Sr. No:	Authors	Transcript	Description	Preliminary Thoughts	Open Code	Initial Category	Refined Category	Sub-themes	Themes	Concept	Concept Code
		These constraints will be imposed partly by the interdependence between water, energy, and climate change. If left unchecked, these connections can exacerbate water and energy shortages and aggravate climate change impacts: Energy is used to supply and treat water; moreover, emissions from energy generation contribute to climate change, which affects water supplies and increases the demand for energy to sustain Earth's growing population and economy.		change, which affects water supplies and increases the demand for energy to sustain Earth's growing population and economy.	performance and business results						
82	Barnett, Kent Mattox, John R.	When measuring outcomes in corporate training, the authors recommend that it is essential to introduce a comprehensive plan, especially when resources are limited and the company needs are vast. The authors hone in on five critical components for shaping a measurement plan to determine the success and ROI of training.	ROI evaluation	When measuring outcomes in corporate training, the authors recommend that it is essential to introduce a comprehensive plan	Challenges overcome with the help of training to enhance performance and business results	Benefits of training and education	Benefits of training and education	Importance of training framework	Effectiveness of training	Framework of Training	FOT
83	Rahman, Mohammad Mafizur Shahbaz, Muhammad Farooq, Abdul	the relationship between financial development, international trade and economic growth for Australia over the period of 1965 to 2010. The autoregressive distributed lag (ARDL) bounds testing approach to cointegration is applied to examine the long-run relationship among the series, whereas stationarity properties of the variables are tested by applying two structural break tests. Results confirm the	ROI processes	The autoregressive distributed lag (ARDL) bounds testing approach to cointegration is applied to examine the long-run relationship among the series, whereas stationarity properties of the variables are tested by applying two structural break tests.	Challenges overcome with the help of training to enhance performance and business results	Benefits of training and education	Benefits of training and education	Importance of training framework	Effectiveness of training	Framework of Training	FOT

Sr. No:	Authors	Transcript	Description	Preliminary Thoughts	Open Code	Initial Category	Refined Category	Sub-themes	Themes	Concept	Concept Code
		long-run relationship among the variables.									
84	Rahman, Mohammad Mafizur Shahbaz, Muhammad Farooq, Abdul	Financial development, international trade, and capital appear as the drivers of economic growth in short and long runs. The feedback effect exists between international trade and economic growth. Financial development Granger causes economic growth validating supply-side hypothesis.	Types of investment	Financial development, international trade, and capital appear as the drivers of economic growth in short and long runs.	A methodology documented in several books by to monetize various training approaches, and a traditional return on investment methodology	ROI methodology offers a practical way (to ROI on investment methodology)	ROI methodology offers a practical way (to ROI on investment methodology)	Effectiveness of ROI framework	ROI Methodology	Return on Investment	ROI
85	Furber, Christine	Framework analysis is now an established method of data analysis used by many qualitative researchers. The method was developed by specialist researchers exploring important aspects of society in order to influence social policy in the UK.	ROI processes	The method was developed by specialist researchers exploring important aspects of society	ROI methodology offers a practical way to forecast the potential payoff before funds are committed	ROI methodology offers a practical way (to forecast the potential payoff)	ROI methodology offers a practical way (to forecast the potential payoff)	Effectiveness of ROI framework	CALCULATION OF COST OF TRAINING	Return on Investment	ROI

Sr. No:	Authors	Transcript	Description	Preliminary Thoughts	Open Code	Initial Category	Refined Category	Sub-themes	Themes	Concept	Concept Code
86	Furber, Christine	The method has five distinct phases that are interlinked and form a methodical and rigorous framework. These phases enable researchers to understand and interpret data, and move from descriptive accounts to a conceptual explanation of what is happening from the data of participants in the study.	Approach to overcome challenges	phases enable researchers to understand and interpret data, and move from descriptive accounts to a conceptual explanation of what is happening from the data of participants in the study.	A methodology documented in several books by to monetize various training approaches, and a traditional return on investment methodology	ROI methodology offers a practical way (to ROI on investment methodology)	ROI methodology offers a practical way (to ROI on investment methodology)	Effectiveness of ROI framework	ROI Methodology	Return on Investment	ROI
87	Furber, Christine	The method is transparent and enables teams of researchers to work together. In this article, the phases of framework analysis are explained. The author uses examples of a qualitative research study where data were analysed using the framework method to illustrate the phases.	Human capital investments	The method is transparent and enables teams of researchers to work together	Result type evaluation necessary to invest in HRD activities	Preliminary requirement to invest in training in an organization	Importance of comprehensive plan for corporate training	REQUIREMENT FRAMEWORK OF TRAINING	CALCULATION OF COST OF TRAINING	Framework of Training	FOT
88	Wang, Lu Jiang, Difei	In order to improve the stability of constant temperature control for indoor environment of buildings, a design method of constant temperature optimisation control system for buildings' indoor environment based on internet of things (IoT) is proposed. The system design is divided into two parts - the control algorithm design and the hardware structure design of the control system - to conduct the overall design framework analysis and functional component analysis of indoor environment constant temperature control system.	Approach to overcome challenges	a design method of constant temperature optimisation control system for buildings' indoor environment based on internet of things (IoT) is proposed.	Result type evaluation necessary to invest in HRD activities	Preliminary requirement to invest in training in an organization	Importance of comprehensive plan for corporate training	REQUIREMENT FRAMEWORK OF TRAINING	CALCULATION OF COST OF TRAINING	Framework of Training	FOT

Sr. No:	Authors	Transcript	Description	Preliminary Thoughts	Open Code	Initial Category	Refined Category	Sub-themes	Themes	Concept	Concept Code
89	Munir, E. Harefa, R. S.M. Priyani, N. Suryanto, D.	Plastic is a naturally recalcitrant polymer, once it enters the environment, it will remain there for many years. Accumulation of plastic as wastes in the environment poses a serious problem and causes an ecological threat.	LEM methodology	plastic as wastes in the environment poses a serious problem and causes an ecological threat.	Challenges overcome with the help of training to enhance performance and business results	Benefits of training and education	Benefits of training and education	Importance of training framework	Effectiveness of training	Framework of Training	FOT
90	Schillebeeckx, Simon J.D. Parikh, Priti Bansal, Rahul George, Gerard	Rural electrification (RE) has gained prominence over the past two decades as an effective means for improving living conditions. Socio-economic and political imperatives along with technological innovation primarily led this growth.	Training process at DISCOM	Rural electrification (RE) has gained prominence over the past two decades as an effective means for improving living conditions.	Training process at DISCOMs and training needs assessment	Benefits of training and education	Need for institutionalizing training process at DISCOM	Importance of training framework	Effectiveness of training	Framework of Training	FOT
91	Schillebeeckx, Simon J.D. Parikh, Priti Bansal, Rahul George, Gerard	Based on a content analysis of 232 scholarly articles, the literature is categorized into four focal lenses: technology, institutional, viability and user-centric. We find that the first two dominate the RE debate. The viability lens has been used less frequently, whilst the user-centric lens began to engage scholars as late as 2007. We provide an overview of the technological, institutional and viability lenses, and elaborate upon the user-centric lens in greater detail.	Approach to overcome challenges	The viability lens has been used less frequently, whilst the user-centric lens began to engage scholars as late as 2007	Challenges overcome with the help of training to enhance performance and business results	ROI methodology offers a practical way (to ROI on investment methodology)	ROI methodology offers a practical way (to ROI on investment methodology)	Effectiveness of ROI framework	ROI Methodology	Return on Investment	ROI
92	Cromwijk, Jan Mateo-Cecilia, Carolina Jareño-Escudero, Cristina Schröpfer, Veronika Veld, Peter Op t.	Successful design and construction processes aiming towards nearly zero energy building (nZEB) standards are a challenge for the whole construction industry in Europe. Realizing nZEB buildings requires innovative design processes, and technologies based on an integrated design approach	Human capital investments	Realizing nZEB buildings requires innovative design processes, and technologies based on an integrated design approach facilitated by multidisciplinary work teams.	ROI changes the framework from usual to sustainable	Comprehensive plan is essential while measuring outcomes in corporate training	Importance of comprehensive plan for corporate training	Importance of training framework	ROI Methodology	Framework of Training	FOT

Sr. No:	Authors	Transcript	Description	Preliminary Thoughts	Open Code	Initial Category	Refined Category	Sub-themes	Themes	Concept	Concept Code
		facilitated by multidisciplinary work teams.									
93	Cromwijk, Jan Mateo-Cecilia, Carolina Jareño-Escudero, Cristina Schröpfer, Veronika Veld, Peter Op t.	The collaboration between architects, engineers, technical experts and building managers, is essential. Therefore, it is necessary to identify the specific involvement of each profession in order to develop mutual understanding of each others' disciplines. Additionally, it is vital to provide professionals with the skills needed to achieve optimal nZEB construction and retrofitting in terms of quality, energy efficiency and cost effectiveness.	Approach to overcome challenges	it is necessary to identify the specific involvement of each profession in order to develop mutual understanding of each others' disciplines	The comprehensive planning is essential when company has limited resources and needs are vast	Comprehensive plan is essential while measuring outcomes in coporate training	Importance of comprehensive plan for corporate training	Isolate effect of training	Effectiveness of training	Framework of Training	FOT
94	Rehman, Ibrahim Hafeezur Sreekumar, Arun Gill, Bigsna Worrell, Ernst	As nearly a fifth of the world's population still lives without access to electricity and double that number with no access to modern cooking technologies, both public and private sector players have invested resources in developing infrastructure to address this energy gap.	Approach to overcome challenges	both public and private sector players have invested resources in developing infrastructure to address this energy gap.	The comprehensive planning is essential when company has limited resources and needs are vast	Comprehensive plan is essential while measuring outcomes in coporate training	Importance of comprehensive plan for corporate training	Isolate effect of training	Effectiveness of training	Framework of Training	FOT
95	Topno, Harshit	Training and development enhances efficiency and develops a systematic way of performing duties and assigned tasks. Moreover it bridges the gap between job requirement and employees present specification.	Training process at DISCOM	Training and development enhances efficiency and develops a systematic way of performing duties and assigned tasks.	The comprehensive planning is essential when company has limited resources and needs are vast	Comprehensive plan is essential while measuring outcomes in coporate training	Importance of comprehensive plan for corporate training	Measure ROI framework	Effectiveness of training	Framework of Training	FOT

Sr. No:	Authors	Transcript	Description	Preliminary Thoughts	Open Code	Initial Category	Refined Category	Sub-themes	Themes	Concept	Concept Code
96	Topno, Harshit	Training like any other organizational activity requires time, energy and money. It's an investment in employees' productivity and retention by providing for career progression and employees job satisfaction over the long time.	ROI evaluation	It's an investment in employees' productivity and retention by providing for career progression and employees job satisfaction over the long time.	RE benefits learning and business	Benefits of training and education	Importance of comprehensive plan for corporate training	Rural Electrification training in DISCOMs	Effectiveness of training	Return on Investment	ROI
97	Sum, Vichet	As training is a powerful means and plays an important role in improving organizational performance and competitiveness, training management deserves more emphasis. Managing training means to plan, implement, and monitor/evaluate training program to support (organization's strategy, goals and objectives) and enhance organizational performance and competitiveness.	ROI evaluation	Managing training means to plan, implement, and monitor/evaluate training program to support	Challenges overcome with the help of training to enhance performance and business results	ROI methodology offers a practical way (to ROI on investment methodology)	ROI methodology offers a practical way (to ROI on investment methodology)	Training budget (keeping in mind the cost and benefit analysis)	CALCULATION OF COST OF TRAINING	Return on Investment	ROI
98	Somasundaram, Usha Valli Egan, Toby Marshall	Employee training and development has emerged as a major educational enterprise over the past three decades. This increase is associated with a demand in the workplace for employee at all levels to improve performance in theirpresent jobs to acquire skills and knowledge to do new jobs, and to continue their career progress in a changing world of work	ROI evaluation	increase is associated with a demand in the workplace for employee at all levels to improve performance in theirpresent jobs to acquire skills and knowledge to do new jobs	ROI changes the framework from usual to sustainable	Comprehensive plan is essential while measuring outcomes in coporate training	Importance of comprehensive plan for corporate training	Training budget (keeping in mind the cost and benefit analysis)	ROI Methodology	Framework of Training	FOT

Sr. No:	Authors	Transcript	Description	Preliminary Thoughts	Open Code	Initial Category	Refined Category	Sub-themes	Themes	Concept	Concept Code
99	Somasundaram, Usha Valli Egan, Toby Marshall	Numerous organizational adages suggest that people are the key to any successful business operation. This emphasis is not empty as it is becoming increasingly clear that no human enterprise can succeed without properly skilled and knowledgeable human resource development professionals	Importance of Human resource	no human enterprise can succeed without properly skilled and knowledgeable human resource development professionals	The comprehensive planning is essential when company has limited resources and needs are vast	Comprehensive plan is essential while measuring outcomes in corporate training	Importance of comprehensive plan for corporate training	Isolate effect of training	Effectiveness of training	Framework of Training	FOT
100	Hong, Q.N. Pluye, P.	The past decade has been rich with methodological advancements in systematic reviews, several of which were inspired by the literature on mixed methods research. Systematic mixed studies reviews—that is, reviews combining qualitative and quantitative evidence—are increasingly popular as they can provide a better understanding of complex phenomena and interventions.	Importance of training	Systematic mixed studies reviews—that is, reviews combining qualitative and quantitative evidence—are increasingly popular as they can provide a better understanding of complex phenomena and interventions.	The comprehensive planning is essential when company has limited resources and needs are vast	Comprehensive plan is essential while measuring outcomes in corporate training	Importance of comprehensive plan for corporate training	Importance of training framework	Effectiveness of training	Return on Investment	ROI
101	Hamiche, Ait Mimoune Stambouli, Amine Boudghene Flazi, Samir	Water and electricity are fundamentally linked. At a basic level electricity generation requires water, and water treatment and transportation use electricity. Historically, there has been little reason to understand the nature of these links, due largely to the presumption that water was not a threat to energy security, nor electricity a threat to water security.	Factors affecting training	the presumption that water was not a threat to energy security, nor electricity a threat to water security.	The comprehensive planning is essential when company has limited resources and needs are vast	Comprehensive plan is essential while measuring outcomes in corporate training	Importance of comprehensive plan for corporate training	Measure ROI framework	ROI Methodology	Return on Investment	ROI

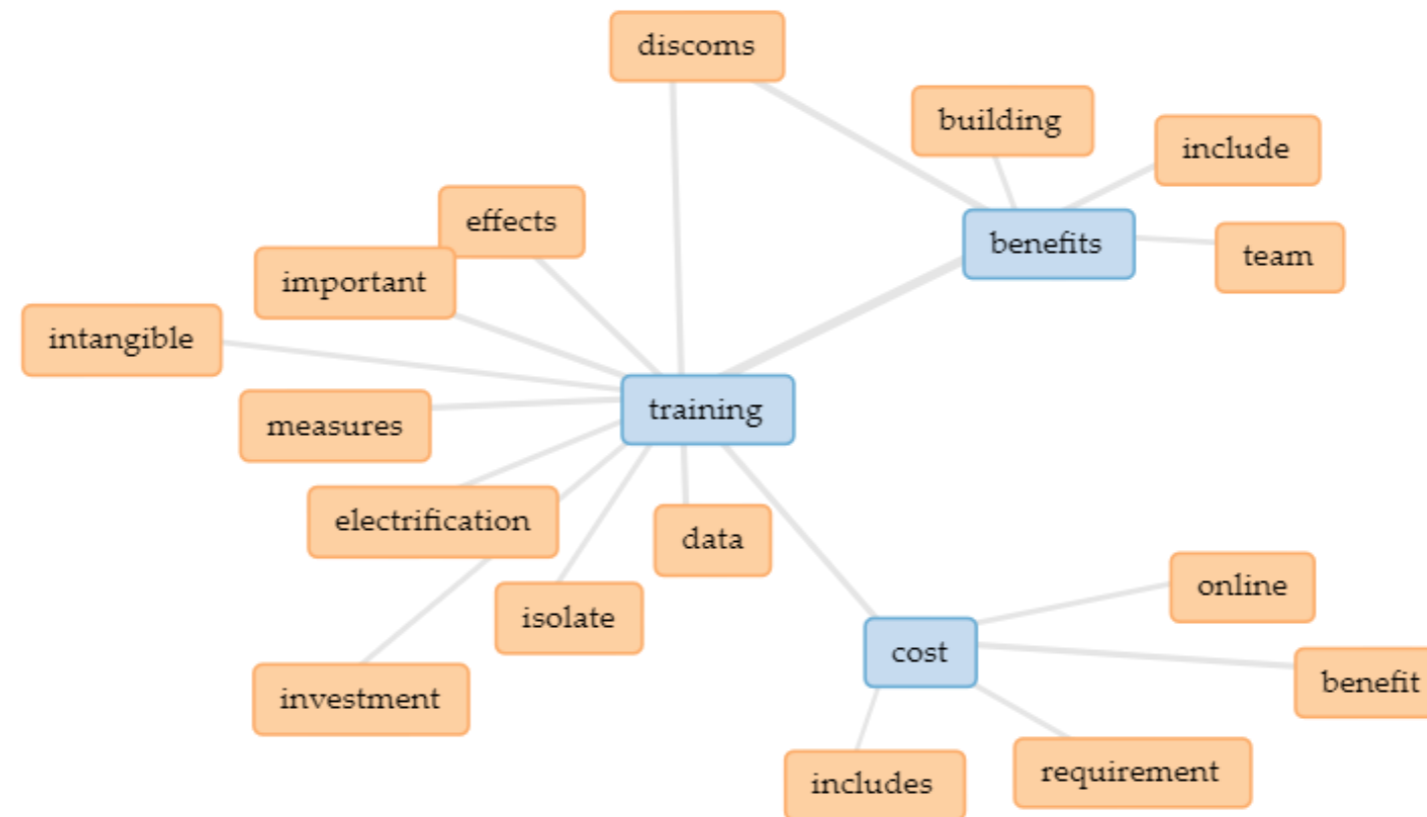
Sr. No:	Authors	Transcript	Description	Preliminary Thoughts	Open Code	Initial Category	Refined Category	Sub-themes	Themes	Concept	Concept Code
102	Chen, Shaoqing Chen, Bin	Energy–water nexus plays a prominent role in developing sustainable roadmap for cities. The energy-related water and water-demanded energy have been mostly treated as two different aspects from a reductionist way of thinking. In this study, we propose a system-based framework to synthesize the interwoven connections between energy consumption and water use in a city.	Factors affecting training	The energy-related water and water-demanded energy have been mostly treated as two different aspects from a reductionist way of thinking.	RE benefits learning and business	Benefits of training and education	Importance of comprehensive plan for corporate training	Training budget (keeping in mind the cost and benefit analysis)	CALCULATION OF BENEFIT OF TRAINING	Framework of Training	FOT

A1.4 DATA FAMILARIZATION TABLE

Review Study Data Familiarization to derive Concept		
Sr. No	Particulars	Items Generated
1	Transcript	102
2	Preliminary thought	98
3	open code	60
4	Initial category	30
5	Refined category	15
6	Sub-theme	7
7	Theme	4
8	Concept	2

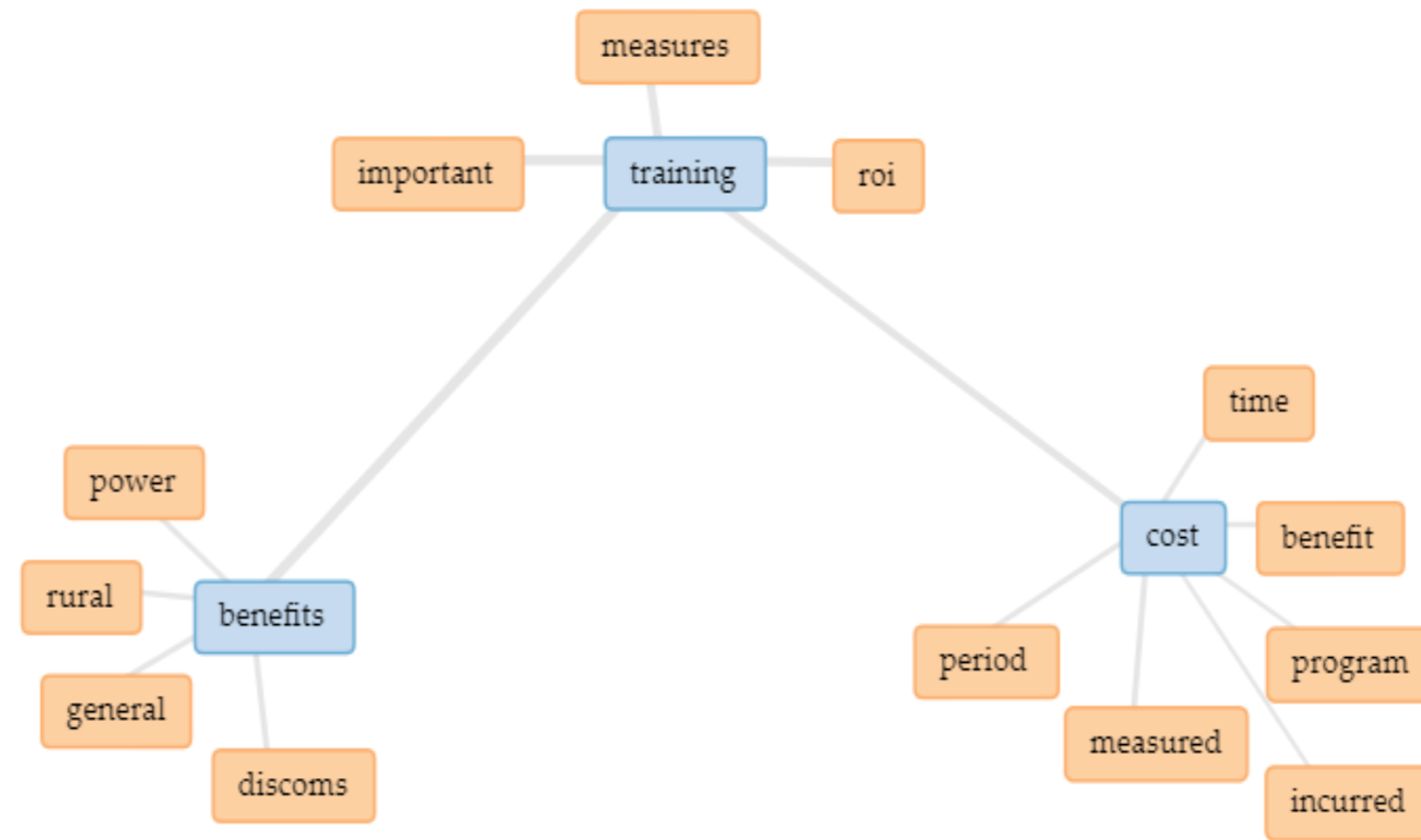
A1.5 CONCEPTUAL LENS

Association between initial category and refined category generated from recorded responses



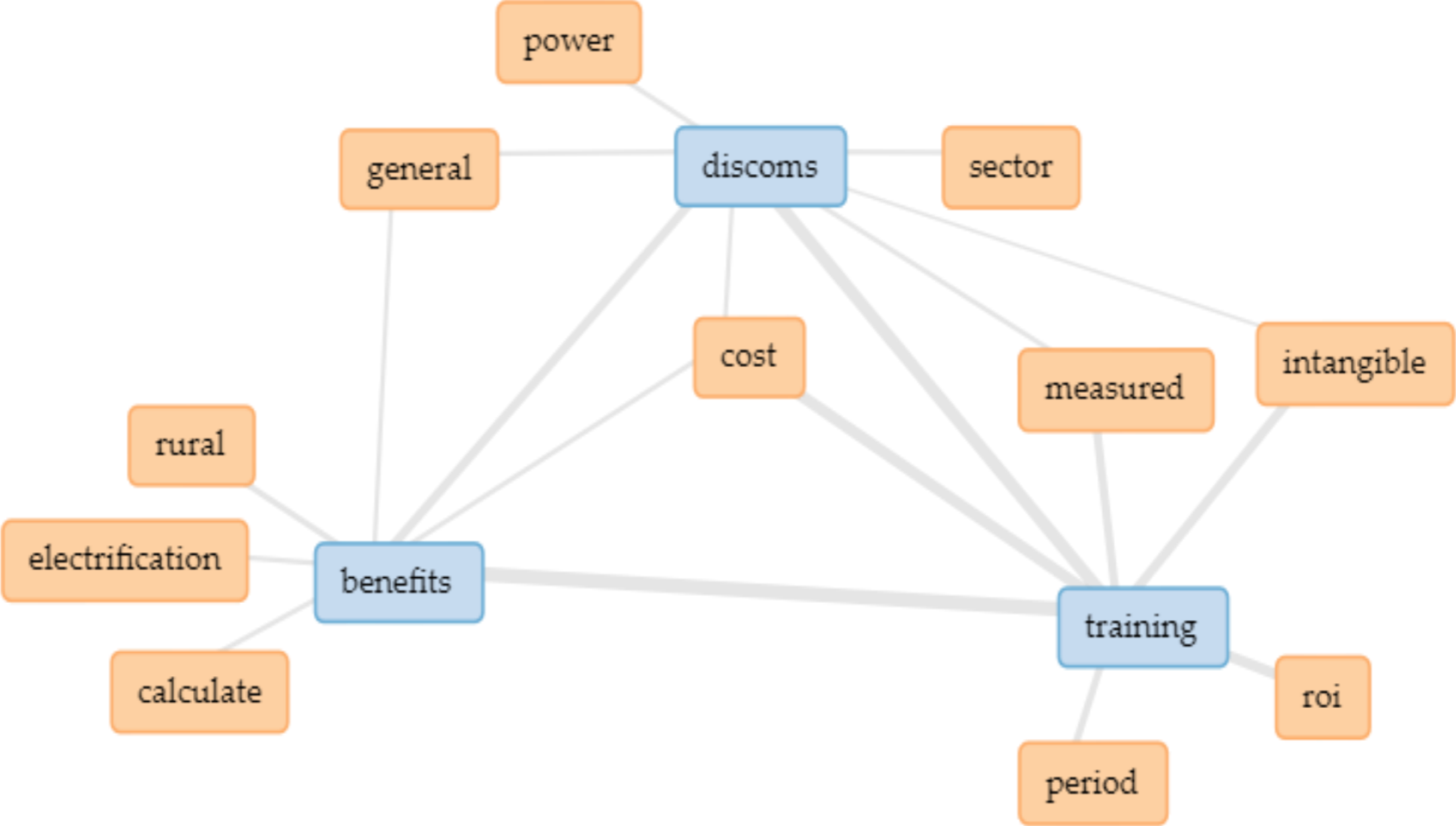
The figure represents how this key codes are associated with one another. Training and benefits are linked together with the help of DISCOMs. Training is associated with benefits and costs. With the help of a diagram, we can assume the connection of each code and its collocates.

ASSOCIATION BETWEEN REFINED CATEGORY AND INITIAL THEME GENERATED FROM RECORDED RESPONSES



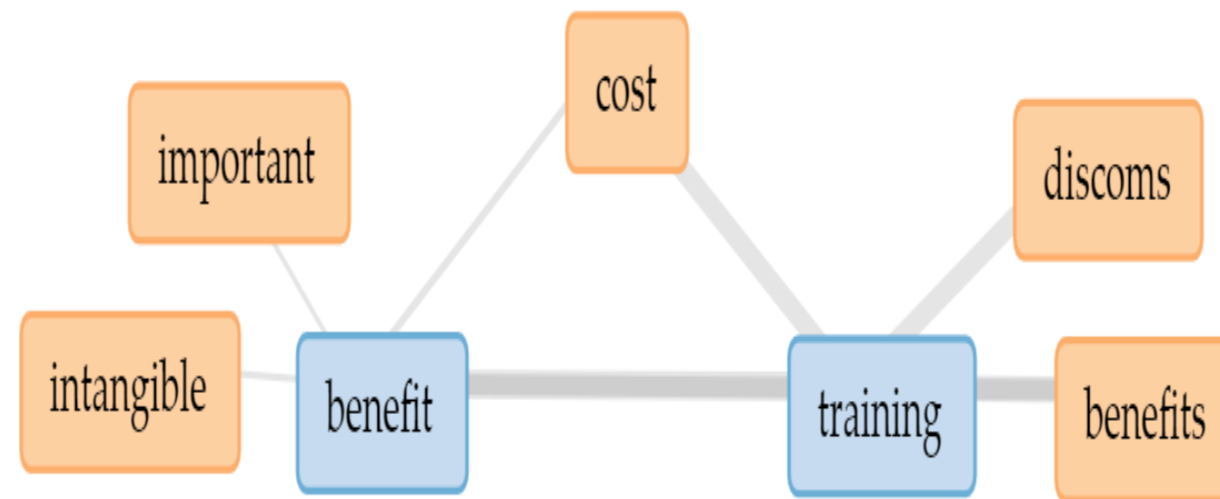
The above represents the association between refined category and initial theme. It can be inferred from the diagram that training is associated with two key codes; cost and benefits. Cost also includes benefit whereas benefits are linked to DISCOMs and benefits in general or in power sector.

ASSOCIATION BETWEEN INITIAL THEME AND FINAL THEME GENERATED FROM RECORDED RESPONSES



The figure represents interconnection between DISCOMs trainings and benefits. They are integrated together to form final theme from initial theme. All three key codes are linked together through cost.

ASSOCIATION BETWEEN FINAL CATEGORY AND CONCEPT GENERATED FROM RECORDED RESPONSES



The figure represents association between final category and concept which sum up to two key codes; benefit and training. Training is linked to benefit through cost and interconnected to codes like benefits and DISCOMs. Whereas benefits are interconnected to codes like intangible and important.

A2 INITIAL PROTOCOL CODEBOOK

A2.1 INITIAL PROTOCOL TRANSCRIPTS

Appendix 2 consists of documents related to initial protocol transcripts and protocol validation. The interview protocol, which was used to record expert responses, was scrutinised through various phases; the initial interview protocol was developed according to themes and sub-themes derived from the data reduction table. Then, sub-themes and themes were made into questions and concepts into section headings. Finally, as a part of triangulation, the initial interview protocol was shared with Experts for their response. The response of expert faculties made the required changes, and the final interview protocol was made.

The response sheet was generated through the responses of 4 experts and coded in-vivo. The saturation table was formed after 18 respondents, including four expert responses.

THEMES	Sr. No	Question	Respondent 1	Respondent 2	Respondent 3	Respondent 4	Respondent 5	Respondent 6
CBT	2	What are the intangible benefits of training in DISCOMs in general and for the power sector?	Training provides the latest knowledge to the officers who got trained. As a result, DISCOMs get long-run benefits that cannot be measured.	Improve in knowledge and productivity of employees, thereby reducing time for completion of work	Overall System strengthening and skill strengthening	Improvement in quality of work.	Employee happiness, balanced life, positive mindset and loyalty	Bridging the skill gap, meet the challenges in the sector due to fast technological changes in generation (Solar and wind), grid integration and stability, and IT-enabled delivery systems like Prepaid and smart metering and smart grid
			training, latest, knowledge, officer, trained, DISCOMs, long, run, benefits, cannot measured	improve, knowledge, productivity, employee, reducing, time, completion	overall, system, strengthening, skill	improvement, quality, work	employee, happiness, balanced, life, positive, mindset, loyalty	bridging, skill gap, meet challenges, sector, fast, technical, changes, generation, solar, wind, grid, integration, stability, IT, enabled, delivery, system, prepaid, smart, metering
			11	6	4	2	6	20
	3	How can we measure intangible benefits?	Intangible benefits to DISCOMs due to training can be measured tentatively by calculating the saving in T&D loss, reduction of transformer failure, reduction in accidents and its financial	The number of safety incidents from last year and to the current year. Improve in productivity also	Yes, from the consumer end and employee manpower end	Overall satisfaction of consumers and employees	the overall behaviour of staff and happy environment	reduction in an outage, failure of transformers, improvement in quality and quantity of power supply, easy and low cost of delivery, reduction in accidents
		intangible, benefits, DISCOMs, training, measured, tentatively, calculating, saving, T&D, loss, reduction, transformer, failure, reduction, accidents, financial, implications	number, safety, incidents, last, year, current, improve, productivity	yes, consumer, end, employee, manpower	overall, satisfaction, consumers, employees	overall, behaviour, staff happiness, environment	reduction, outage, failure, transformers, improvement, quality, quantity, power, supply, easy, low, cost, delivery, accidents	

		17	8	5	2	4	9
4	Over what period benefit is calculated?	Every year.	One year	It is a time-consuming process	15 years	6-12months after training	Over 4-5 years till technology changes or a person changes role or new training
		every year	one, year	time, consuming, process	15, years	6, 12 months, training	over, period 4,5, year, technology, changes, person, undergoes, role, new, training
		2	1	3	1	4	10

THEME	Sr. No	Question	Respondent 1	Respondent 2	Respondent 3	Respondent 4	Respondent 5	Respondent 6
	5	What are the short, medium and long term benefits of training?	Day to day efficiency due to training is the short-term benefit, whereas increased profitability is the medium/long term benefit.	Improve in knowledge and productivity of employees, thereby reducing time for completion of work	Short term improve confidence Medium-term improve the working skill of manpower Long term consumer satisfaction and truth for DISCOMs	Short time: Improvement in working Medium Term: Reduction in fatalities Long Term: The desired improvement achieved	Short term: feel good, increased belief, Medium-term: increased performance, better coordination among staff, conflict management, the Long term: feeling of fulfilment, becoming a leader and influencing others both in the	Short term - immediate improvement in working areas, share the knowledge with others colleagues to improve their working and Organization will benefit as skill obtained will be helpful for many employees by sharing f knowledge and experience
			day, efficiency, due, training, short, term, benefit, increased, profitability, medium, long, term, benefit	improve, knowledge, productivity, employee, reducing, time, completion	the short, term, improve, confidence, medium, skill, manpower, long, consumer, satisfaction, truth, DISCOM	short, term, improvement, working, medium, reduction, fatalities, long, desired, achieved	short, term, feel good, increased performance, better co-ordination, staff conflict management, long, feeling, fulfilment, becoming, leader, influencing, both, workplace, outside	short, term, immediate, improvement, working, areas, knowledge, colleagues, improve, organization, benefit, skill, obtained, useful, employees, experience
			13	7	9	4	16	4
	6	According to you, what benefits can the training framework bring for rural electrification?	Training of officers of DISCOMs made the village electrification works faster in rural India and helped the DISCOMs manage the situation better during natural calamities, i.e., cyclones, etc.	Improve in knowledge and productivity of employees, thereby reducing time for completion of work	Full utilization of all govt schemes, provide satisfactory SAIFI/SAIDI reports	Reduction in losses	Better service, More and faster productivity	The last mile connectivity in the value chain and most important in the link is a distribution primarily in rural areas often neglected. If the quality and quantity are improved can contribute significantly to the state GDP as improvement in quality of life will lead to improved revenue to DISCOMs and pave the way for an increase in small scale and MSME industries so that all utility, consumer and State will benefit.

			Training, officers, DISCOMs, villages, electrification, works, faster, rural, India, DISCOMs, manage, situation, better, natural, calamities, cyclone	improve, knowledge, productivity, employee, reducing, time, completion	full, utilization, govt. the scheme, provide satisfactorily, SAIFI, SAIDI, reports	reduction, losses	better, service, more, faster, productivity	last, mile, connectivity, value, chain, important, link, distribution, rural, areas, neglected, quality, quantity, improved, revenue, DISCOM, pave, way, increase, small, scale, MSME, industries, utility, consumer, state, benefit
			16	7	8	2	4	20

THEMES	Sr. No	Question	Respondent 1	Respondent 2	Respondent 3	Respondent 4	Respondent 5	Respondent 6
RM	1	What are the important measures of return on investment in Training?	All input cost of power and interest on borrowed funds	Analysis of the pre and post-training improvement of employees	Overall improvement of a n employee as well as Discom	Maximum employees should get well trained	More and satisfied customers bring more profits, Saving wastage of Electricity and unnecessary costs	the cost involved in the training of employees in any particular year for the utility as a whole and the benefits derived by the corporation compared to pre and post-training
			input, cost, power, interest, borrowed, funds	analysis, pre, post, training, improvement, employees	overall, improvement, employee, DISCOMs	maximum, employees, get, trained	more, satisfied, customers, more, profits, savings, wastage, electricity, unnecessary costs	cost, involved, training, employees, utility, whole, benefits, derived, corporation, compared, pre, post, training
			6	6	2	2	10	8
	2	How ROI methodology helps train Investment f DISCOMs for Rural Electrification	Calculable benefits due to training for a particular period divided by the amount spent during that period on training will give ROI relating to training.	The analysis will improve the training methodology and framework	Reduction in losses	Reduction in AT&C losses.	During revenue realisation	Presently no significant methodology adopted
			calculable, benefits, training, particular, period, divided, amount, spent, period, training, ROI, training	analysis, improvement, training, methodology, framework	reduction, losses	reduction, AT&C losses	revenue, realisation	presently, no, significant methodology, adopted
			12	4	2	0	2	2
ET	1	What factors impact the results of ROI?	All cost components relating to training affect the ROI.		Collection and analysis are the key factors	Monetary data to be analysed	Training fees received, cost of conducting the training programs	Some of the benefits of the training may accrue over some time
			All cost, components, relating, training, effects, ROI		collection, analysis, key, factor	Monetary data, analysed	training, fees, conducting, training, program	benefits, training, accrue, over, period, time
			7	0	4	2	4	6

	2	How do we isolate the effect of training?	Very difficult to isolate.		Control groups are arguably the most accurate way to isolate the impact of training as a comparison is made between the performance of your training group and the performance of a group that has not received training	KPI points to be considered	This can be done by making training institutes in Discoms.	It may be tried by training one segment and one cluster and compare the other circle in the same segment.
			very, difficult, isolate		control, groups, arguably, most accurate, isolate, impact, training, comparison, between, performance, received, training	KPI points considered	training, institute, DISCOMs	tried, training, one, segment, cluster, compare, other, circle, same
			3	0	12	3	2	8

Interview protocol Response code

THEMES	Sr. No	Respondent 7	Respondent 8	Respondent 9	Respondent 10	Respondent 11	Respondent 12	Respondent 13	Respondent 14
CCT	1	4-5 years	Over a financial year	It varies from programme to programme	For each program cost, we can calculate	For Each programme, the duration of the programme (no of days) and manpower cost are involved from the planning stage till the completion of the	The cost of training is calculated yearly	One year	It should be after every month
		4, 5, year	financial, year	varies, program	the program, cost, calculate	the programme, duration, manpower, cost, planning, stage, completion	cost, training, calculated, yearly, basis	one, year	every month
		2	1	1	1	0	1	0	0
	2	Training Exp	food, hospitality, technological advancement	Faculty payments, including external faculties, distribution of training materials, training hall, food, tea etc., and stay arrangements to participants if it is an in-house training	stationery, study material, tool kits, lecture hall, food honorarium, teaching aids	Lunch, tea, stationery, water, faculty remuneration, etc	The cost incurred during the training programmes mainly includes the cost of topic delivered by Resource person, food etc.	Faculty fee, training materials, food, etc.	It should be more than 1500 per employee
		Training Exp	hospitality, technological advances	payments, external faculties, distribution, training, materials, hall, food, tea, stay, arrangements, participants, in-house,	stationery, study, material, tool kits, lecture halls, food, honorarium, teaching, aids	lunch, tea, stationery, water, faculty, remuneration	cost, incurred, training, programme, resource, tool	faculty fee, training, food	1500, employee
		1	2	5	5	4	4	3	2
	3	Intangible costs are not directly measured, but it has undoubtedly had a tangible impact on the performance of DISCOMs	air travel of faculty, cost of refreshment of participants and cost of study material in both hard and soft copies, cost of photography and cost of the tool kits provided while C&D	It is very difficult to measure precisely the intangible costs and benefits	Depends	The intangible cost of creating a brand name for the Institute is very difficult to measure.	Intangible costs are not directly measured, but it has undoubtedly had a tangible impact on the performance of DISCOMs	Not measured	It can be identified but not quantified
		intangible, cost, not directly, measured, real impact, performance,	cost, boarding, lodging, air, travel, faculty, refreshment, participants, study, material, hard, soft, copies, photography, tool, kit, C&D, level, training	difficult, measure, intangible, cost, benefits	depends	intangible cost, creating, brand name, institute, difficult, measure	intangible cost, directly, impact, performance, DISCOMs	not, measured	identified, not qualified
	4	13	0	0	0	4	1	1	
	1	Increased work efficiency	The first benefit comes from a change in mindset, and other benefits include skill development, personality development, and knowledge addition.	Learning, correcting the mistakes of the past, following the best practices being adopted by other DISCOMs /states etc	Once we train a person .what he/she learned in class .it may he/she use in the field with this it improves customer relationship, technical skills, work quality will improve	Employees get a promotion; their self-esteem Is increased, and they are motivated to work with interest	The rate of accidents, failure of power and damage to machinery and equipment will be kept to a minimum by well-trained employees. These will also lead to less cost of production per unit in the case	It improved the field performance, reduced accidents, created safety awareness among staff, technical upgradation etc.	It increases efficiency, fewer accidents& overall benefits

		increased work, efficiency	first, benefit, form, mindset, skill, development, personality, knowledge, addition	learning, correcting, mistakes, past, following, best, practices, adopted, DISCOM states	train, improve customer relationships, technical skills, work, quality	employee, promotion, self-esteem, increased motivation, interest	rate, accidents, failure, power, damage, machinery, equipment, minimum, well-trained, employees, less, cost, production, generation	improved, field, performance, reduced accidents, safety, awareness, staff, technical, upgradation	increases, efficiency, fewer accidents, overall benefits
		0	6	9	7	5	12	10	3

THEMES	Sr. No	Respondent 7	Respondent 8	Respondent 9	Respondent 10	Respondent 11	Respondent 12	Respondent 13	Respondent 14
CBT	2	Well trained employees	Intangible benefits include a change in attitude, change in thinking, and development of positive aspects of personality.	Knowledge updation of the trainee, career growth, when trained employees put on the job, the quality of work and efficiency will improve in DISCOMs, which contributes to the development of power sector	psychological changes will take place in the participant. There is a small scope if he/she feels this company is his/her company attitude will change, seeing speaking regarding the company will change. A trained person is an asset to the organization /society/nation.to get that much experience takes more time.	Increase in self-esteem, CRM, and interest in work	Training helps the employees do their jobs efficiently and develop better ways to go about their day-to-day tasks to make the DISCOMs profitable.	Improved confidence morale of staff. Thereby improved performance.	Increases efficiency
		well, trained employees	intangible benefits include change, attitude, thinking, development, positive aspects, personality	knowledge, updation, trainee, career, growth, trained, programme, job, quality, work, efficiency, improve, DISCOM, contribute, development, power, sector	psychological, participant, scope, company, attitude, trained, asset, society, nation, experience	increase self, esteem, CRM, interest, work	training, employees, jobs, efficiency, better ways, day-to-day, DISCOMs, profitable	improved confidence, morale, staff, performance	increases, efficiency
		2	6	15	6	2	4	2	2
	3	It can be identified but not quantified	These can be measured by feeling a change in someone's overall behaviour and attitude.	Very difficult to measure exactly	after training, when we take the feedback, we can observe changes	Growth in revenue and reduction in electrical accidents after training	By measuring gains due to intangible and tangible benefits, the difference will represent the value of the intangible benefits.	Quantum of consumer complaints,	It can be identified but not quantified
		identified, quantified	measured, feeling, chance, overall, behaviour, attitude	difficult, measure	training, feedback, observation, changes	growth, revenue, reduction, electrical, accidents, training	measuring, gains, intangible, tangible, benefits, value	quantum, consumer, complaints	identified, quantified
		2	3	1	4	4	3	2	2

	4	4-5 Years	The benefit is calculated over the years together.	It depends on the program	we can get benefits after training. The organization should give training on new things in a phased manner frequently. When a c o m p a n y is implementing/ inducting new things. It should give immediately. If it takes more time, it may not get that much benefit. Train the participants working on that particular area on a war foot basis.	For 4-5 years till technology changes or person changes role or new training	The benefit of training imparted to the employees can be calculated depending on the short, medium- and long-term training	One year	Immediately
		4,5, year	benefit, calculated, over, year, together	depends, program	benefits, training, organization, frequently, implementation, participants, foot basis	over, period, 4,5, year, technology, changes, new, training	benefit, training, imparted, employees, calculated short, medium, long, training	one, year	immediately
		0	3	2	3	0	8	0	0

THEMES	Sr. No	Respondent 7	Respondent 8	Respondent 9	Respondent 10	Respondent 11	Respondent 12	Respondent 13	Respondent 14
	5	Increased work efficiency	Short benefits include knowledge addition, Medium benefits include behaviour change, and long term benefits include making public relations better and winning more hearts.	Knowledge updation, learning new things, relearning, and unlearning. When trained personnel do the work, the performance improves	there is no short term/medium /long term benefits are always long term benefits only.	Short term - immediate improvement in working areas, share the knowledge with others colleagues to improve their working and Organization will benefit as skill obtained will be useful for many employees by sharing f knowledge and	Short term training expands your knowledge without disrupting your work, and long term training not only produces upskilled employees but also increases the efficiency of the DISCOMs	Quality improvement, conference, safety awareness etc.	Efficiency, morals & increased growth
		increased work, efficiency	short, benefits, include knowledge, addition, medium, change, behaviour, long, making, public, relations, better, winning, hearts	knowledge, updation, learning, new things, relearning, training, personnel, performance, improve	short, medium, long, term, benefits	short, term, immediate, improvement, working, areas, knowledge, colleagues, improve, organization, benefit, skill, obtained, useful, employees, experience	short, term, training, expand, knowledge, disrupting, training, produce, upskilled, employee	quality, improvement, conference, safety, awareness	efficiency, morals, increased growth
		0	6	5	0	0	8	5	2

	6	Well trained employees perform work safely	It can increase the organisation's reputation to pour more funds into it by the Govt.	All Rural working staffs to be trained in a short period to create a change	it needs 50-50. 50% practical 50% theory then only participants can get benefits . Particularly our education system designed for theory more practical less .it is not advisable. For a few things, it is advisable. For technical programs, it is not advisable. We have to change our attitude. Teaching	Trainees come to know that even now, some villages in their jurisdiction are unelectrified and work efficiently to electrify the villages.	The benefits of training bring increased efficiency and power quality with fewer outages.	Reduces accidents by safety awareness, improvement in quality of service	It changes a lot
		well, trained, employee, perform, work, safely	Increase, reputation, organization, funds, poured, govt.	rural, working, staffs, trained, short, period, change	50, practical, theory, participants, benefits, particularly, education, system, designed, practical, methodology, advisable, culture, workmen	trainees, villages, jurisdiction, unelectrified, work, efficiently, electrify	benefits, training, increased efficiency, quality, power, fewer outages	reduces accidents, safety, awareness, improvement, quality, service	changes
		6	5	2	12	7	6	4	1

THEMES	Sr. No	Respondent 7	Respondent 8	Respondent 9	Respondent 10	Respondent 11	Respondent 12	Respondent 13	Respondent 14
RM	1	When Rural Electrification provides quality training, more investment can be made by the DISCOMs toward Rural Electrification.	The important return measures include the development of more skilled manpower with knowledge addition and the development of good work culture in any organization.	Training fees are the primary source. However, making training programs free of cost will also indirectly help get new business.	Training is not an investment.do not expect it. A trained person is an asset to the organization/nation/self. Add more skill-oriented programs; then, we can see changes.	Employees get promotions.	Training requires time, money and resources, and return on investment measures include increased skills, increased annual revenue, and improved power quality.	Reduction of the accident, improvement in revenue and reduction of administrative cost	Are the benefits out from the cost of training
		quality, training, rural, electrification, investment, DISCOMs	necessary, measures, return, include, development, more, skilled, manpower, knowledge, addition, development, good, work, culture, organization	fees, major, source, making, training, program, free, cost, indirectly, help, business	training, investment, trained, asset, organization, nation, self, add, skill, oriented, program	employees, promotion	training, require, time, money, resources, measures, return, investment, annual, revenue, quality, power	reduction, accident, improvement, revenue, reduction, administrative, cost	benefits, cost, training,
		0	12	9	4	0	7	2	0
	2	NA	When Rural Electrification provides quality training, more investment can be made by the DISCOMs toward Rural Electrification.	Through improvement of quality of service	Reduction in losses	Calculable benefits due to training for a particular period divided by the amount spent during that period on training will give ROI relating to training.	ROI methodology means the total investment divided by the annual savings expressed in years. Further, the trainees are gaining new knowledge and skills so that they can increase efficiency or reduce costs at the workplace	Through improvement of quality of service	During revenue realization
		NA	quality, training, provided, rural, electrification, obviously, more, investment, DISCOMs, rural, electrification	improvement, quality, service	reduction, losses	calculable, benefits, training, particular, period, divided, amount, ROI	ROI, methodology, investment, divided, annual, savings, expressed, gaining, knowledge, skills, increase, efficiency, reduce, costs, workplace	improvement, quality, service	revenue, realization
		0	6	1	0	4	9	2	2

ET	1	Employee turnover	Skilled Faculty, greater investment in participants and better quality of training can impact ROI.	Training fees received, cost of conducting the training programs	Monetary data to be analysed	All cost components relating to training affect the ROI.	Are trainees gaining new knowledge and skills to increase efficiency at the workplace and measuring the cost of this training against the benefits to both the individuals and the organization?	Improvement in performance, technical upgradation	Market power & better access to talent
		employee, turnover	skilled, faculty, greater, investment, participants, better, quality, training, impact, ROI	training, fees, received, cost, conducting, training, programs	monetary, data, analysed	All cost, components, relating, training, effects, ROI	trainees, knowledge, skills, increase, efficiency, workplace, measuring, cost, training, benefits, individuals, organization	improvement, performance, technical, upgradation	market, power, better, access, talent
		2	6	4	0	0	6	2	5
	2	Isolating the effect is very difficult	This can be done by making training institutes in DISCOMs.	The effect of the training cannot be isolated	KPI points to be considered	Very difficult to isolate.	It may happen that the department will not get as much money next year if we do not present some evidence that we are having a positive effect on desired goals with regard to respective training	A refreshment course may be included	Visualise efficiency, morals etc
		isolating, effect, very difficult	making, training, industries, DISCOMs	effect, training, cannot, isolated	KPI points considered	very, difficult, isolate	department, money, present, evidence, positive, effect, desired, goals, respective	refreshment, course, included	visualize, efficiency, morals
		1	2	0	0	0	6	2	2

THEMES	Sr. No	Respondent 15	Respondent 16	Respondent 17	Respondent 18
CCT	1	CTC is calculated every month of a financial year	Every financial year cost of training expenditure can be calculated throughout DISCOM.	Period cost Calculations are based on estimates made	one year
		CTC, calculated every month, financial	every financial, year, cost, training, expenditure, calculated, DISCOM	Period, time, cost, calculation, estimates	one, year
		2	2	2	0
	2	Training materials, Equipment, Stationary, Faculty Fee, Facility costs (Cost of food, refreshments, travel etc.), loss of productivity due to loss of work due to the absence of employees during training	Accommodation food course material faculties honorarium Travelling expenses etc	Reimbursement of Expenses incurred by Employee during training	travel, accommodation, remuneration, stationery
		training, equipment, stationary, faculty, fee, cost, loss, productivity, absence, employee	accommodation, food, course material, faculties, honorarium, travelling, expenses	reimbursement, expenses, incurred, employee, training	travel, accommodation, remuneration, stationery
		2	5	3	0
	3	Apportionment of salary of all employees associated with the programme, upkeep of campus and hostel, security, water and power cost general administration charges	Intangible costs cannot be quantified but can estimate, such as employee morale, company name etc	an intangible cost is a cost that can be identified but can not be qualified or easily estimated	Not measured
	apportionment, salary, employee, programme, upkeep, campus, hostel, security, water, power cost, general, administration, changes	intangible, cost, cannot be quantified, estimated, employee, morale, company	intangible, cost, identified, qualified, easily, estimated	Not measured	
		14	2	0	0
	1	Improved Organizational commitment and efficiency, Improved Employee satisfaction, Fewer errors, Decrease in safety violations, Increased Revenue, Improved communication and team work, Improved Customer satisfaction and reduction in complaints, Reduced conflicts and stress, Overall improvement in	Training improves the efficiency of employees and educates easy working methods for the current trends	understanding the people's capacity building in clean energy portfolios	It increases efficiency, fewer accidents& overall befits

		improved, organizational, commitment, efficiency, improved, employee, satisfaction, fewer, errors, decrease, safety, violation, revenue, communication, teamwork, customer, satisfaction, reduction, conflicts, stress, productivity	training, improvement, efficiency, employees, education, methods, current trends	capacity, building, clean, energy, portfolios	Increases, efficiency, benefits
		20	4	1	0

THEMES	Sr. No	Respondent 15	Respondent 16	Respondent 17	Respondent 18
CBT	2	Improved Organizational commitment and efficiency, Improved Employee satisfaction, Fewer errors, Decrease in safety violations, Increased Revenue, Improved communication and team work, Improved Customer satisfaction and reduction in complaints, Reduced conflicts and stress, Overall improvement in productivity	When the efficiency of DISCOMs improved. The power sector of the country's growth is also improves	will do their job effectively and better with day to day tasks and more profitable	Increases efficiency
		improved, organizational, commitment, efficiency, improved, employee, satisfaction, fewer, errors, decrease, safety, violation, revenue, communication, teamwork, customer, satisfaction, reduction, conflicts, stress, productivity	efficiency, DISCOMs, improved, power, sector, country, growth	job, effectively, better tasks, profitable	efficiency
		15	4	4	0
	3	Conducting a training program for selected employees and determining a reasonable rate for improved performance allows for calculating savings and identifying changes in behaviour and attitude. Total anticipated savings can be calculated by dividing the amount of savings by the number of trainees who participated in the program.	We can survey the efficiency of DISCOMs after aggressive training	the process of elimination to assign quantitative values to intangible benefits after they achieved	It can be identified but not quantified
		conducting, training, program, selected, employee, reasonable, improved, performance, calculate, savings, identify, behaviour, attitude, anticipated, amount, trainees	survey, efficiency, DISCOMs, aggressive, training	process, elimination, assign, quantitative, intangible, benefits, achieved	identified, quantified
		8	4	5	0
	4	The benefit is calculated every month of a financial year	Period of three years	time benefits are calculated after employees do their implementation at the DISCOMs end	One year
		benefit, calculated every month, financial	period, three years	time, benefit, calculated, implemented, employees, DISCOMs	one, year
	3	2	4	0	

THEMES	Sr. No	Respondent 15	Respondent 16	Respondent 17	Respondent 18
	5	Improved Organisational commitment and efficiency, Improved Employee satisfaction, Fewer errors, Decrease in safety violations, Increased Revenue, Improved communication and team work, Improved Customer satisfaction and reduction in complaints, Reduced conflicts and stress, Overall improvement in productivity	Short term benefits: Need-based training improves technical developments. Medium-term: Employees' Attitudes and morale change in the management. Long term benefits: Financial improvements and consumer satisfaction	the basis of data used is information during these training	Improved knowledge, Improved skill, reduced outages,
		improved, organisational, commitment, efficiency, improved, employee, satisfaction, fewer, errors, decrease, safety, violation, revenue, communication, teamwork, customer, satisfaction, reduction, conflicts, stress, productivity	short, term, benefit, need, training, improves, technical, development, medium, attitude, morale, changes, management, long, financial, improvements, consumer, satisfaction	basis, data, information, training	Improved knowledge, skill, reduced outages
		15	10	2	0
	6	Improved Organisational commitment and efficiency, Improved Employee satisfaction, Fewer errors, Decrease in safety violations, Increased Revenue, Improved communication and team work, Improved Customer satisfaction and reduction in complaints, Reduced conflicts and stress, Overall improvement in productivity	All Rural working staff to be trained in a short period	The first survey to be done then proper estimates to bring 100% electrification in rural areas	It changes a lot

		improved, organisational, commitment, efficiency, improved, employee, satisfaction, fewer, errors, decrease, safety, violation, revenue, communication, teamwork, customer, satisfaction, reduction, conflicts, stress, productivity	rural, working, staffs, trained, short, period	first, survey, estimates, electrification, rural areas	change
		14	4	2	0

THEMES	Sr. No	Respondent 15	Respondent 16	Respondent 17	Respondent 18
RM	1	Identifying the training needs of the organization, Training benefits and Training Costs	Repeated Training is the only measure	trainees have actively participated in what they learn in training. Can they apply in their workplace	When Rural Electrification provides quality training, obviously more investment can be made by the Discoms towards Rural Electrification.
		identifying, training, organization, benefit, cost	repeated, training, measure	trainees, actively participated, apply, workplace	quality, training, rural, electrification, investment, DISCOMs
		1	1	2	0
	2	ROI methodology can be used to justify the expense of training programs	ROI Methodology is the one whether we can invest in Training or by other means	return on investment in rural electrification is when it is 100% achievement done	During revenue realisation
		ROI, methodology, justify, expense, training, program	ROI, methodology, investment, training	return, investment, rural, electrification, achievement	revenue, realisation
		5	0	2	0
ET	1	Training benefits and Training Costs	We have to analyze which field to be taken care of by the results of ROI	Some of the benefits of the training may accrue over some time	Training fees received, cost of conducting the training programs
		training, benefits, cost	analyze, field, results, ROI	benefits, training, accrue, over, period, time	training, fees, conducting, training, program
		0	0	0	0
	2	By comparing the performance of each employee before and after training, the impact on business before and after training	BY Group discussions	Maybe tried with training one segment and one cluster and compare the other circle in the same segment.	Maybe tried with training one segment and one cluster and compare the other circle in the same segment.

		comparing performance, employee, training, impact, business, before, after	group, discussion	tried, training, one, segment, cluster, compare, other, circle, same	tried, training, one, segment, cluster, compare, other, circle, same
		4	1	0	0

A2.2 VALIDATION RESPONSE SHEET

Sr. No:	Name	Age (Coded as A)	Gender (Coded as G)	Level of Education (Coded as LE)	Name of the Organization (Coded as NoO)	Current Role (Coded as CR)	Experience/Length of service in this role in years (Coded as LoS)
1	Confidentiality Mentioned	Above 35	Male	Postgraduate	Energy Consultants	Faculties conducting training of DISCOMs	Above 18
2	Confidentiality Mentioned	Above 35	Male	Postgraduate	TSSPDCL	Training Coordinator of DISCOMs	Above 18
3	Confidentiality Mentioned	Above 35	Female	Postgraduate	MP Paschim Kshetra Vidyut Vitaran Co.Ltd.Indore	Nodal Training Officer of DISCOMs	Between 9 and 18
4	Confidentiality Mentioned	Above 35	Male	Postgraduate	JdVVNL Jodhpur	Training Coordinator of DISCOMs	Between 9 and 18

GTQ 1. The number of employees participating in training last year?	GTQ 2. Number of Years your organization has been providing training?	GTQ 3. What is your total budget?	GTQ 4. Number of years you have been involved in a training function in this or any other position (in any organization)	GTQ 5. State of the DISCOM.	GTQ 6. Size of the DISCOMs (include full-time, part-time, and contract employees)	TBE 1. Are intangible costs measurable?
around 1200	10 Years	Rs 1Lakh / Year	More than 15 Years	Almost all Discoms Pan India	5,000-10,000	Yes
4800	60 years	2.17 Crores per year	More than 15 Years	TELANGANA STATE SOUTHERN POWER DISTRIBUTION COMPANY	10,001-20,000	Yes
2863	15 years	3000 Cr	6-10 Years	Madhya Pradesh	20,001-40,000	No
1000	20+ Years	15 Lacs for Training	11-15 Years.	Rajasthan	10,001-20,000	Yes

Response Sheet Validation

TBE 2. Are intangible benefits measurable?	TBE 3. Does Rural electrification training in DISCOMs bring any significant enhancement in performance for the power sector?	TBE 4. Is the investment in Rural electrification training programs for DISCOMs worth the return for DISCOMs	CT 1. Over what period cost is calculated?	CCT 2. What costs are incurred during training programmes?
Yes	Yes	Yes	Recent 12 months	The last 12 months have been online Programs, Cost of Online platform, follow up Telephonic calls, internet charges, administrative costs for setting up the program and presence during the program for ensuring the reliable transmission of Training and maintaining discipline. Pre Covid time during face to face interaction, cost of travel, food, and stay along with marginal opportunity costs
Yes	Yes	Yes	Every Month	Faculty Honorarium, Training Materials Such As Printed Books, Toolkits, Pendrives/ Cds, Breakfast Lunch, Dinner Tea, Snacks To Participants.
Yes	Yes	Yes	Quarterly, Bi-annual, yearly or as per requirements	Literature, Faculty honorarium, Travel, accommodation, Venue, Hospitality, Stationary
Yes	Yes	Yes	20 Years	1.25 Lacs per Batch (Batch Capacity of 25)

CCT 3. How can we measure intangible costs?	CBT 1. What are the benefits of Training DISCOMs?	CBT 2. What are the intangible benefits of training in DISCOMs in general and for the power sector?	CBT 3. How can we measure intangible benefits?
The individual officer attending the training or delivering the training program usually is not available during the interactive program, which creates the costs of not being directly assigned to the training program	The Affordability of Power needs total discipline in reducing losses, making the system reliable and resilient. Moreover, a complete understanding of the dynamics of the front end and users' end and its impact on the health and earning status, thus adding value to the national economy, gets highlighted and appreciated by the person getting trained.	Each of the employees of Discom is working on a closed four walls approach for his/ her department. Unless the DISCOMs employee understands the linkages within the Power System, one can not improve his value addition	The measure of the understanding of various aspects and linkages of Power System before and after training evaluates the training benefits - Tangible as well as intangible
Feedback from the officers to whom the employees report for duty after training. Performance of the team member with respect to KPI(Key Performance Indicators)	Electricity is one of the critical drivers of the economy. In today's world, electricity has become an essential commodity. DISCOMs are the last link of the power supply chain and directly deal with the consumers. "power flow" starts from generation to transmission, distribution, and end consumer. However, the cash flow starts from the end consumer to distribution, transmission, and generation. So DISCOMs must serve customers and earn money from them. Moreover, this money is injected into the power sector. If DISCOMs function efficiently, then the power sector will sustain itself. Hence training DISCOMs will benefit the power sector. Therefore, training expenses should not be treated as a cost but should be treated as investments for betterment.	Intangible benefits in general: 1. service quality 2.Enhanced efficiency 3.Customer service. Intangible benefits of training in Discoms for the power sector: 1. uninterrupted power supply by optimum utilization of available and human resources. Energy saved is energy produced. Hence, reducing at&c losses will reduce operating costs of generation, transmission, and distribution. In particular, reduce the consumption of coal and fossil fuels. Environmental protection & ecological balance. Sustainable development. 2. Customer satisfaction is the basic pillar for any organization and thy DISCOMs and power sector. In light of reforms, competition is also inevitable in the power sector. Hence to retain the customers, DISCOMs must drive towards not just customer satisfaction but must move further toward customer delight	By Measuring KPIs (Saifi, Saidi, Caifi, Caidi...) Reduction In Accidents, Equipment Failures, A n d Losses. Increase In Revenue Collections, Increased Metered Sales, Customer Feedback(Surveys)
Using a survey, feedback reports , market survey	Training programs refresh the knowledge, develop conceptual understanding, improve confidence morale, achieve desired results, remove deadlocks, and improve productivity & efficiency of employees.	Morale, the confidence of employees, improved efficiency, team building, for power sector benefits include satisfied customers, fewer complaints/grievances	Carrying out surveys, public feedback,
Depends	Death rates decrease drastically; work quality improves, the confidence of employees improves while training	Manpower Strengthening, Systems reliability increased, Improved Power Supply QUALITY, fear o accident is reduced, Overall Skill improvement of employees	All factors related to employees Satisfaction, Customer Satisfaction, and Discoms Financial Health are considered while measuring intangible benefits

CBT 4. Over what period benefit is calculated?	CBT 5. What are the short, medium and long term benefits of training?	CBT 6. According to you, what benefits can the training framework bring for rural electrification?	RM 1. What are the important measures of return on investment in Training?
Various Periods of 1 Year, 2, 5 Years remove the abrasions, if any but Covid has changed the scene, and with computerising the instant results, it can be frequent, as little as six months	A step towards Affordability of Power with fewer outages by making the system reliable, predictive breakdown, making the system a resilient one, updates in Technology and personal growth	Rural Electrification is catering to a low-density population, and that too in small consumption gets lower priority in attendance of electrical faults. Moreover, the training helps local entrepreneurs handle Electricity if they become certified technicians.	The cost of having a multi-skilled workforce vs a workforce with individuals of various disciplines, including time taken to restart the system in case of failure, can be quantified to include economic loss saved of human life saved
YEARLY	Short term: knowledge imparted to employees. Medium-term: skill development and efficiency improvement. Long term: employees' attitude is a driving force for the journey towards customer delight—the overall performance of the DISCOMs is excellent in all parameters.	An elevated level of knowledge, skill and attitude of employees will drive rural electrification and thus the nation's economy.	KPIs
Quarterly, Bi-annual, Yearly etc	Short term - employee connections, team building, Medium - knowledge upgradation, long term-improvement of employee productivity, org. Reputation, development of brand image,	Training shall empower people for know-how to new projects being implemented for the rural sector, adoption of new technology, higher connectivity, expansion of the team, team building, team strengthening,	Higher productivity levels, higher ratings of consumer feedback, Discom ratings
Long Term approx 20 Years	In the Short term, employees' confidence is boosted, and fear during the fault removal process is reduced; in medium time frame, death rates of employees are reduced; in the long term, Power Supply reliability and Customer Satisfaction have improved.	Awareness about Government Schemes, determination to supplying all rural area consumers, reduction in AT&C losses	The skillset of employees, Number of employees to be trained.

RM 2. How ROI methodology helps train Investment f DISCOMs for Rural Electrification	ET 1. What factors impact the results of ROI?	ET 2. How do we isolate the effect of training?
ROI is an important parameter, but if we start comparing the ROIs of the Urban, Industrial and Rural Electricity sector, the results will vary, but these are equally important for society before it takes the shape of Rural vs Urban protests	Type of equipment on which training is to be provided, the basic knowledge level from where the training has to start and inputs provided accordingly	Usually, the training gets embedded in the mind of the training. Post Training and Pre Training data and perceptions of individuals and their supervisors (about the workforce with them) can help
In Any Activity, ROI is a crucial method to decide the investment. So we have to measure both tangible and intangible benefits of training vs training investment.	Method of measurement and its accuracy.	Same employee performance before and after training. Make two groups of employees, one who is trained other not trained for the same parameter, measure their performance and thus the difference.
For rural network development & expansion, employees need to be upgraded to the latest technologies work procedures so that employee is high morale, productivity & efficiency levels are high to meet deadlines & targets	Time, technology, Geographical area, political scenario, management systems	Providing necessary support systems, competent approvals, sufficient time, efficient team, technology, healthy environment etc
Overall AT&C loss reduction further improved the financial health of Discoms	Converting benefits to financial data and then collecting and analysing them.	Control group on the trained team member's performance linked to KPI with trend line analysis and the expert estimation on performance of employee (Expert may be manager or leader of the employee)

Data Management of Interview (New Open codes and Categories)					
Sr. No:	Questions	Description (in vivo code)	Preliminary Thought	Open Code	Initial Category
1	Over what period cost is calculated?	Period, Time, Cost, Calculated	A period in which cost is calculated	Recent 12 months, Every month, Quarterly, Bi-annual, yearly or as per requirements	Cost of benefit is calculated yearly or as per requirement
2	What costs are incurred during training programs?	Costs, Incurred, Training, Program	Costs incurred during a training program	Online Programs, Cost of Online platform, follow up Telephonic calls, internet charges, administrative costs for setting up the program and presence during the program for ensuring the reliable transmission of Training and maintaining discipline. Pre COVID time during face to face interaction, cost of travel, food and stay along with marginal opportunity costs, Faculty Honourarium, Training Materials Such As Printed Books, Toolkits, Pendrives/ CDs etc., Breakfast, Lunch, Dinner, Tea, & Snacks for Participants, Literature, accommodation, Venue, Hospitality, Stationary	The cost incurred during the program includes expenses primarily due to covid-19, including online programs, internet charges, and online platformed costs. Whereas pre covid cost includes: faculty honorarium, training material, Stationary, Refreshments, etc.
3	How can we measure intangible costs?	Measure, Intangible, Costs	Measure intangible cost	Feedback from the officers to whom the employees report for duty after training. Performance of the employee with respect to KPI (Key Performance Indicators), Using a survey, feedback reports, market survey	Intangible costs can be measured using surveys, Key performance indicators, Feedback and market survey
4	What are the benefits of Training in DISCOMs?	Benefits, Training, DISCOMs	Benefits of training in DISCOMs	By adding value to the national economy, the person getting trained is highlighted and appreciated, "power flow" starts from generation to transmission, distribution, and end consumer. However, the cash flow starts from the end consumer to distribution, transmission, and generation. So DISCOMs must serve customers and earn money from them, injected into the power sector. So if DISCOMs function efficiently, then the power sector will sustain. Training programs refresh the knowledge, develop conceptual understanding, improve confidence morale, achieve desired results, remove deadlocks, and improve productivity & efficiency of employees.	Benefits of training in DISCOMs include: Cashflow from end consumers helps DISCOMs function efficiently and sustain the power sector, refresh the knowledge, improves confidence, removes deadlocks, etc

Sr. No:	Questions	Description (in vivo code)	Preliminary Thought	Open Code	Initial Category
5	What are the intangible benefits of Training in DISCOMs and the Power Sector?	Intangible, Benefits, Training, DISCOMs, General, Power, Sector	Intangible benefits of training in DISCOMs	Intangible Benefits in General: 1.Service Quality 2.Enhanced Efficiency 3.Customer Service. Intangible benefits of training in DISCOMs for the power sector: 1. Uninterrupted power supply by optimum utilization of available resources and human resources. 2. Energy saved is energy produced. Hence, reducing at&c losses will reduce operating costs of generation, transmission, and distribution. In particular, reduce the consumption of coal and fossil fuels. Environmental protection & ecological balance. Sustainable development. 3. Customer satisfaction is the basic pillar for any organization and thy DISCOMs and power sector. In light of reforms, competition is also inevitable in the power sector. Hence, DISCOMs must drive towards customer satisfaction and move further towards customer delight to retain the customers. Morale, the confidence of employees, improved efficiency, team building, for power sector benefits include satisfied customers, fewer complaints/grievances	Intangible benefits of DISCOMs, in general, include service quality, morale, enhanced efficiency, and team building. The intangible benefits of DISCOMs for the power sector include uninterrupted power supply by optimum utilization, energy saved and produced, customer satisfaction and fewer complaints/grievances.
6	How can we measure intangible benefits?	Measure, Intangible, Benefits	Measure intangible benefits	Understanding various aspects and linkages of Power systems before and after training evaluates the training benefits - Tangible and intangible/ "By Measuring KPIs (SAIFI, SAIDI, CAIFI, CAIDI) Reduction In Accidents, Equipment Failures, a n d Losses. Increase In Revenue Collections, Increased Metered Sales, Customer Feedback(Surveys)"/ Carrying out surveys, public feedback,	Intangible costs are measured by understanding various aspects and linkages of the power system, measuring KPIs, by equipment failures, carrying out surveys and feedback, etc
7	Over what period benefit is calculated?	Period, Time, Benefit, Calculated	A period in which benefit is calculated	Various Periods of 1 Year, 2, 5 Years remove the abrasions if any but Covid has changed the scene and with computerising the instant results it can be frequent, as little as six months/ Yearly/ Quarterly, Bi-annual, Yearly etc	The benefit of training can be calculated quarterly, bi-annually or yearly

Sr. No:	Questions	Description (in vivo code)	Preliminary Thought	Open Code	Initial Category
8	What are the short, medium and long term benefits of training?	Short, Medium, Long, Term, Benefits, Training	Short, medium and long term benefits of training	A step towards Affordability of Power with fewer outages by making the system reliable, predictive breakdown, a resilient one, updates in Technology and personal growth/ "Short Term: Knowledge Imparted To Employees. Medium-Term: Skill Development And Efficiency Improvement. Long Term: Attitude Of Employees, which is A Driving Force For The Journey Towards Customer Delight. Overall Performance of The Discoms Excellent in All Parameters."/	Short term benefits of training are knowledge imparted to employees' team building. Medium-term benefits include skill development, efficiency improvement and knowledge upgradation. Long term benefits include: improvement in the overall performance of DISCOMs, improvement of employee productivity, reputation and building of brand image
9	According to you, what benefits can the training framework bring for rural electrification?	Benefits, Training, Framework, Rural, Electrification	Benefits training framework can bring in for rural electrification	Rural Electrification is catering to a low-density population, and that too in small consumption gets lower priority in attendance of electrical faults. The training helps the local entrepreneurs handle Electricity if they become certified technicians./ Elevated Level of Knowledge, Skill and Attitude Of Employees Will Drive the Rural Electrification and Thus The Nation's Economy./ Training shall empower people for know-how to new projects being implemented for the rural sector, adoption of new technology, higher connectivity, expansion of the team, team building, team strengthening	Benefits of training in rural electrification are to cater to low-density population, get lower priority in attendance of electricity faults, elevated level of knowledge, skill and attitude of employees, expansion of the team, etc
10	What are the important measures of return on investment in Training?	Important, Measure, Return, Investment, Training	An important measure of ROI of training	The cost of having a multi-skilled workforce vs a workforce with individuals of various disciplines, including time taken to restart the system in case of failure, can be quantified to include economic loss saved of human life saved/ KPIs/ Higher productivity levels, higher ratings of consumer feedback, Discom ratings	Crucial measures of ROI of training include: KPIs, higher productivity levels, higher ratings of consumer feedback, etc

11	How ROI methodology is helpful for training Investment of DISCOMs for Rural Electrification	ROI, Methodology, Training, Investment, DISCOMs, Rural, Electrification	The usefulness of ROI methodology for training investment for rural electrification	ROI is an important parameter, but if we start comparing the ROIs of the Urban, Industrial and Rural Electricity sector, the results will vary. However, these are equally important for society before it takes the shape of Rural vs Urban protests/ In Any Activity, Roi is An Important Method To Decide The Investment. So We Have To Measure Both Tangible And Intangible Benefits Of Training Vs Training Investment./ For rural network development & expansion, employees need to be upgraded to the latest technologies, work procedures so that employee is high morale, productivity & efficiency levels is high to meet deadlines & targets	Importance of ROI methodology for training investment for rural electrification by measuring both tangible and intangible benefits of training vs training investment, it is important for employees to be upgraded to the latest technologies work procedures to improve efficiency levels in order to meet deadlines and targets
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Sr. No:	Questions	Description (in vivo code)	Preliminary Thought	Open Code	Initial Category
12	What factors impact the results of ROI?	Factors, Impact, Results, ROI	Factors Impacting ROI result	Type of equipment on which training is to be provided, the basic knowledge level from where the training has to start and inputs provided accordingly/ method of measurement and it is accuracy/ Time, technology, Geographical area, political scenario, management systems	Factors that alter ROI results include the type of equipment on which training is to be provided, basic knowledge level, method of measurement and its accuracy, time, technology, etc
13	How do we isolate the effect of training?	Isolate, Effect, Training	Isolating the effect of training	Usually, the training gets embedded in the mind of the training. However, post Training and Pre Training data and perceptions of individuals and their supervisors (about the workforce with them) can help/ "Same Employee Performance Before And After Training. Make Two Groups Of Employees, One Who Are Trained Other Not Trained. For The Same Parameter, Measure Their Performance And Thus The Difference."/ Providing necessary support systems, competent approvals, sufficient time, efficient team , technology, healthy environment etc	To isolate the effects of training post and pre- training data is essential, and perceptions of individual & their superiors can help; also, the same parameter should be used to measure two different variables, providing necessary support systems, competent approvals, sufficient time, etc. are the isolated training effects
					13

Descriptive Accounts				
Initial category	Refined Category	Initial Theme	Final Theme	Concept
Cost of benefit is calculated yearly or as per requirement	Period to calculate the cost of benefit as per requirement	Period to calculate the benefit of training	Benefits of training in DISCOMs	Benefit of training
The cost incurred during the program includes online expenses primarily due to covid-19; this includes online programs, internet charges, the cost of the online platform, etc. Whereas pre covid cost includes: faculty honorarium, training material, Stationary, Refreshments, etc.	Cost of training during program pre and post covid measured	Cost of training during program pre and post covid	Cost of training during the program	Cost of training
Intangible costs can be measured using surveys, Key performance indicators, Feedback and market survey	Means to measure intangible costs incurred during training	Intangible cost of training measured	Intangible cost of training measured	Cost of training
Benefits of training in DISCOMs include: Cash flow from end consumers helps DISCOMs function efficiently and sustain the power sector, refresh the knowledge, improve confidence, remove deadlocks, etc.	Benefits of training in DISCOMs in general and in the power sector	Benefits of training in DISCOMs in general and in the power sector	Benefits of training in DISCOMs	Benefit of training
Intangible benefits of DISCOMs, in general, include service quality, morale, enhanced efficiency, and team building. In contrast, intangible benefits of DISCOMs in the power sector include uninterrupted power supply by optimum utilization, energy saved and produces, customer satisfaction and fewer complaints/grievances.	Benefits of training in DISCOMs in general and in the power sector	Benefits of training in DISCOMs in general and in the power sector	Benefits of training in DISCOMs	Benefit of training

Intangible costs are measured by understanding various aspects and linkages of the power system, measuring KPIs, by equipment failures, carrying out surveys and feedback, etc	Various aspects measure intangible costs	Intangible cost of training measured	Intangible cost of training measured	Cost of training
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Initial category	Refined Category	Initial Theme	Final Theme	Concept
The benefit of training can be calculated quarterly, bi-annually or yearly	Period to calculate the cost of benefit as per requirement	Period to calculate the benefit of training	Benefits of training in DISCOMs	Benefit of training
Short term benefits of training are knowledge imparted to employees' team building. Medium-term benefits include skill development, efficiency improvement and knowledge upgradation. Long term benefits include: improvement in the overall performance of DISCOMs, improvement of employee productivity, reputation and building of brand image	Benefits of training measured in different periods of timespan	Benefits of training over a different period	Benefits of training in DISCOMs	Benefit of training
Benefits of training in rural electrification are to cater to low-density population, get lower priority in attendance of electricity faults, elevated level of knowledge, skill and attitude of employees, expansion of the team, etc	Benefits of training in rural electrification	Benefits of training in rural electrification	Benefits of training in rural electrification	Benefit of training
Crucial measures of ROI of training include: KPIs, higher productivity levels, higher ratings of consumer feedback, etc	Necessary measures of ROI of training	Important measures of ROI of training	Necessary measures of ROI of training	ROI methodology
Importance of ROI methodology for training investment for rural electrification by measuring both tangible and intangible benefits of training vs training investment, it is important for employees to be upgraded to the latest technologies work procedures to improve efficiency levels in order to meet deadlines and targets	Important measures of ROI of training	Important measures of ROI of training	Important measures of ROI of training	ROI methodology
Factors that alter ROI results include the type of equipment on which training is to be provided, basic knowledge level, method of measurement and its accuracy, time, technology, etc	Factors that affect ROI result	Factors affecting the result of ROI methodology	Factors affecting ROI methodology	ROI methodology
To isolate the effects of training post and pre-training data is essential, and perceptions of individual & their superiors can help; also, the same parameter should be used to measure two different variables, providing necessary support systems, competent approvals, sufficient time, etc. are the isolated training effects	Isolate the effects of training post and pre-training data is important	Isolate effect of training- post and pre-training	Effects isolated from training	Effectiveness of training
13	11	9	7	4

A3 INTERVIEW PROTOCOL CODEBOOK

Appendix 3 represents recorded responses from participants from Faculties conducting training of DISCOMs, Training Coordinator of DISCOMs, Nodal Training Officer of DISCOMs, Head of training DISCOMs etc. The interview was taken in 3 stages: first recording the demographic profile of the respondents, second recording their general responses on training based on their experiences and finally, their view on ROI Methodology and Effectiveness of training.

A3.1 TRANSCRIPT

Sl No	Name	Age	Sex	Level of Education	GTQ 1. Number of employees participating in training last year?	GTQ 2. Number of Years your organization has been providing training?	GTQ 3. What is your total budget?	GTQ 4. Number of years you personally have been involved in a training function in this or any other position (in any organization)	GTQ 5. State of the DISCOM.	GTQ 6. Size of the DISCOMs (include full-time, part-time, and contract employees)	TBE 1. Are intangible costs measurable?	TBE 2. Are intangible benefits measurable?	TBE 3. Does Rural electrification training in DISCOMs bring any significant enhancement in performance for power sector?	TBE 4. Is the investment on Rural electrification training programs for DISCOMs worth the return for DISCOMs
1	Dr YP Chawla	Above 35	Male	Postgraduate	around 1200	10 Years	₹ 1Lakh / Year	More than 15 Years	PAN INDIA	5,000-10,000	Yes	Yes	Yes	Yes
2	Gowli Mahesh Kumar	Above 35	Male	Postgraduate	4800	60 years	₹2.17 Crores per year	More than 15 Years	TELANGANA	10,001-20,000	Yes	Yes	Yes	Yes
3	Sapna Damesha	Above 35	Female	Postgraduate	2863	15 years	₹ 3000 Cr	10 Years	Madhya Pradesh	20,001-40,000	No	Yes	Yes	Yes
4	Surendra Choudhary	Above 35	Male	Postgraduate	1000	20+ Years	₹ 15 Lacs for Training	15 Years.	Rajasthan	10,001-20,000	Yes	Yes	Yes	Yes
5	Shishira Kumar Mohanty	Above 35	Male	Postgraduate	15000	35 YEARS	₹15 crore per annum.	10 Years	PAN INDIA	1-1000	No	No	Yes	Yes
6	Muralidhar Dasyapu	Above 35	Male	Postgraduate	1000	More than 20 years	₹ 40 lakhs	More than 15 Years	Telangana	Over 40,000	Yes	Yes	Yes	Yes
7	Venkatesan Narasimhalu	Above 35	Male	Postgraduate	more than 2000	More than 30 years	₹800 lakh	10 Years	Telangana	Over 40,000	No	Yes	Yes	Yes
8	RK Anuragi	Above 35	Male	Graduate	450	15	₹30-35 Lakhs	10 Years	Rajasthan	10,001-20,000	No	Yes	Yes	Yes
9	Javid Ahmad Khan	Above 35	Male	Graduate	150	7	₹ 200 Lakh	5 Years	Jammu and Kashmir	20,001-40,000	No	No	Yes	Yes

10	A Veluchamy	Above 35	Male	Postgraduate	About 500	Since 1990	₹15 lakh	15 Years.	Kerala	20,001-40,000	No	No	Yes	Yes
11	S.Raju Naik	Above 35	Male	Postgraduate		More than 20 years	₹7 lakh	10 Years	TELANGANA	10,001-20,000	Yes	Yes	Yes	Yes
12	Jyothi	Above 35	Female	Graduate	472	More than 20 years	₹5 lakh	5 Years	Karnataka	5,000-10,000			Yes	Yes
13	Gulshan Bhagat	Above 35	Male	Graduate	842	More than 20 years	₹50 lakh	5 Years	JPDCJ Jammu	1,001-5,000	Yes	Yes	Yes	Yes
14	Satya Prasad	Above 35	Male	Postgraduate	1300	15	₹ 2 crores	15 Years.	Karnataka	5,000-10,000	No	No	Yes	Yes
15	Adil Bashir Gurkhu	Above 35	Male	Postgraduate	250	Approximately 20 years	5 Crore	5 Years	J&K	Over 40,000	No	No	Yes	Yes
16	Rekha R	Above 35	Female	Graduate	10787	Approximately 20 years	₹ 6 Crore	5 Years	Kerala	20,001-40,000	No	Yes	Yes	Yes
17	Sridharan	Above 35	Male	Graduate	3000	30 yrs	₹ 50 lakh	5 Years	TAMIL NADU	Over 40,000	No	No	Yes	Yes
18	Anupama	Above 35	Female	Graduate	2000	10 years	₹20 lakh	5 Years	Karnataka	Over 40,000	Yes	Yes	Yes	Yes
19	Narasimha Murthy	68	Male	Graduate	1000	40	₹30 lakh	15 Years.	Andhra Pradesh	Over 20,000	Yes	Yes	Yes	Yes
20	Y S Rao	70	Male	Graduate	1200	40	₹50 lakh	25 Years	Maharastra	Over 20,000	Yes	Yes	Yes	Yes
21	Ms Uma Rani	62	Female	Graduate	15000	35	₹40 lakh	15 Years.	Almost all Discoms Pan India	Over 30,000	Yes	Yes	Yes	Yes
22	M L Gupta	66	Male	Graduate	16000	7	₹30 lakh	7 Years	HIMACHAL	Over 20,000	Yes	Yes	Yes	Yes

Sl No	CCT 1. Over what period of time cost is calculated? (word limit: 30-40 words)	CCT 2. What costs are incurred during training programmes? (word limit: 30-40 words)	CCT 3. How can we measure intangible costs?(word limit: 30-40 words)	CBT 1. What are the benefits of Training DISCOMs? (word limit: 30-40 words)	CBT 2. What are the intangible benefits of training in DISCOMs in general and for power sector? (word limit: 30-40 words)	CBT 3. How can we measure intangible benefits? (word limit: 30-40 words)	CBT 4. Over what period of time benefit is calculated? (word limit: 30-40 words)	CBT 5. What are the short, medium and long term benefits of training? (word limit: 30-40 words)	CBT 6. According to you what benefits can training framework bring in for rural electrification?(word limit: 30-40 words)
1	Recent 12 months	Last 12 months have been online Programs, Cost of Online platform, follow up Telephonic calls, internet charges, administrative costs for setting up the program and presence during the program for ensuring the reliable transmission of Training and maintaining discipline. Pre Covid time during face to face interaction, cost of travel, food and stay along with marginal opportunity costs	The individual officer attending the training or delivering the training program is normally not available during the interactive program, creates the costs of not directly assigned to the training program	The Affordability of Power needs a total discipline in reducing losses, making the system reliable and resilient. A full understanding of the dynamics of front end and users' end as well its impact on the health and earning status thus adding value to the national economy get highlighted and appreciated by the person getting trained.	Each of the employee of Discom is working on closed 4 walls approach of his/ her department. Unless the discom employee understands the linkages within the Power System one can not improve his value addition	The measure of the understanding of various aspects and linkages of Power System before and after training evaluates the training benefits - Tangible as well as intangible	Various Time spans of 1 Year, 2, 5 Years remove the abrasions if any but Covid has changed the scene and with computerising the instant results it can be frequent , as little as 6 months	A step towards Affordability of Power with less outages by making the system reliable, predictive breakdown, making the system a resilient one, updates in Technology and personal growth	The Rural Electrification is catering to a low density population and that too in small consumption, gets lower priority in attendance of electrical faults. The training helps in making the local entrepreneurs to handle Electricity if they become certified technicians.

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2	Every Month	Faculty Honorarium, Training Materials Such as Printed Books, Tool Kits, Pen drives/ CDs Etc, Breakfast Lunch, Dinner Tea, & Snacks to Participants.	Feedback from the officers to whom the employees report for duty after training. Performance of the employee with respect to KPI(Key Performance Indicators)	Electricity is one of the key drivers of the economy. In today's world electricity has become an essential commodity. DISCOMs are the last link of power supply chain and are directly dealing with the consumers. "Power flow" starts from generation and then to transmission and then to end consumer. But the cash flow starts from end consumer to distribution and then to generation. So DISCOMs must serve customers and earn money from them. And this money is injected to power sector. If DISCOMs function efficiently then the power sector as a whole will sustain. Hence training DISCOMs will benefit the power sector. Training expenses should not be treated as cost but should be treated as investment for betterment.	Intangible Benefits in General: 1.Service Quality 2.Enhanced Efficiency 3.Customer Service. Intangible Benefits of Training in DISCOMs for Power Sector: 1.Uninterrupted power supply by optimum utilization of available resources and human resources in particular. 2. Energy saved is energy produced. Hence reduction of AT&C losses will reduce operating costs of generation, transmission and distribution. In particular reduce the consumption of coal and fossil fuels. Environmental protection & ecological balance. Sustainable development. 3. Customer satisfaction is the basic pillar for any organization and the DISCOMs and power sector. In the light of reforms competition is inevitable in power sector also. Hence to retain the customers, DISCOMs must drive towards not just for customer satisfaction but must move further towards customer delight	By Measuring KPIS (SAIFI, SAIDI, CAIFI, CAIDI...) Reduction In Accidents, Equipment Failures, Losses. Increase In Revenue Collections, Increased Metered Sales, Customer Feedback (Surveys)	Yearly	Short Term: Knowledge Imported to Employees. Medium Term: Skill Development and Efficiency Improvement. Long Term: Attitude of Employees Which Is a Driving Force for The Journey Towards Customer Delight. Overall Performance of The DISCOMs Excellent in All Parameters.	Elevated Level of Knowledge, Skill and Attitude of Employees Will Drive the Rural Electrification and Thus the Nation's Economy.

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3	Quarterly, Bi-annual ,yearly or as per requirements	Literature, Faculty honorarium, Travel, accomodation, Venue, Hospitality, Stationary	By means of survey , feedback reports ,market survey	Training programs refresh the knowledge , develops conceptual understanding, improves confidence, morale, means to achieve desired results, removes deadlocks, improves productivity & efficiency of employees.	Morale, confidence of employees, improved efficiency , team building, for power sector benefits include satisfied customers , fewer complaints/grievances	Carrying out surveys , public feedback,	Quarterly, Bi-annual, Yearly etc	Short term - employee connections, team building, Medium - knowledge upgradation, long term- improvement of employee productivity , org. reputation, development of brand image ,	Training shall empower people for know how to new projects being implemented for rural sector, adotion to new technology , higher connectivity, expansion of team , team building, team strenghtening,
4	20 Years	1.25 Lacs per Batch (Batch Capacity of 25)	Depends	Death rates decreases drastically, work quality improved, confidence of employees is improving while training	Manpower Strengthening, Systems reliability increased, Improved Power Supply QUALITY, fear o accident is reduced, Overall Skill improvement of employees	All factors related to employees Satisfaction, Customer Satisfaction, and Discoms Financial Health are considered while measuring intangible benefits	Long Term approx 20 Years	In Short term confidence of employees is boosting and fear during fault removal process id reduced, in medium time frame death rates of employees reduced, In long term Power Supply reliability and Customer Satisfaction has improved.	Awareness about Government Schemes, determination to provide supply to all rural area consumers, reduction in AT&C losses
5	Training cost is budgeted for one year.	Direct cost i.e. training material, lodging and boarding, conveyance, etc. And indirect costs, i.e. staff salary, electricity,etc.	Intangible cost for creating a brand name for the Institute is very difficult to measure.	Increase in day to day working efficiency of officers, reduction of transformer failure, reduction of accidents and thereby saving lives of field staff, better customer care, etc.are major benefits to DOSCOMS.	Training provides latest knowledge to the officers those got trained.DISCOMS get long run benifits benefits which cannot be measured.	Intangible benefits to DISCOMs due to training can be measured tentatively by calculating the saving in T&D loss, reduction of transformer failure, reduction in accidents and	Every year.	Day to day efficiency due to training is the short term benefit where as increased profitability is the medium/long term benefit.	Training of officers of DISCOMs made the village electrification works faster in rural India and helped the DISCOMs to manage the situation better during natural calamities, i.e, cyclone,etc.

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						it's financial implications .			
6		Travel, Food, Accommodation, Stationary, Venue, Remuneration		Employee empowerment, increase in performance, better relationships and smooth functioning of departments	Employee happiness, balanced life, positive mindset and loyalty	overall behaviour of staff and happy environment	6-12months after training	Short term: feel good, increased belief, Medium term: increased performance, better co-ordination among staff, conflict management, Long term: feeling of fulfilment, becoming a leader and influencing others both in workplace and outside.	Better service, More and faster productivity
7	For Each programme duration of the programme (no of days) and man power cost involved from planning stage till completion of programme.	Faculty remuneration, study material, study tour and Boarding and Lodging and man power associated with the programme	Apportionment of salary of all employees associated with programme, upkeep of campus and hostel, security, water and power cost general administration charges	Safe operation and proper maintenance of the assets, improve the quality and duration of supply, reduction of losses and up to date knowledge on trends and development in the sector.	Bridging the skill gap, meet the challenges in sector due to fast technical changes in generation (Solar and wind), grid integration and stability and IT enabled delivery system like Prepaid and smart metering and smart grid	reduction in outage, failure of transformers, improvement in quality and quantity of power supply, easy and low cost of delivery, reduction in accidents	Over a period of 4-5 year till technology changes or person undergoes change in role or new training	Short term - immediate improvement in working areas, share the knowledge with others colleagues to improve their working and Organization will benefit as skill obtained will be useful for many employees by sharing f knowledge and experience	The last mile connectivity in the value chain and most important in the link is distribution which is mostly rural areas are often neglected. If the quality and quantity is improved can contribute significantly to the state GDP as improvement in quality of life will lead to improved revenue to discom and pave way of increase in small scale and MSME industries so that all utility, consumer

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									and State will benefit.
8	4-5 years	Training Exp	NA	Increased work efficiency	Well trained employees	NA	4-5 Years	Increased work efficiency	Well trained employees perform work safely
9	Over a financial year		Cost of boarding, lodging and air travel of faculty , cost of refreshment of participants and cost of study material in both hard and soft copies, cost of photography and cost of tool kits provided while C&D level training.	The first benefit comes in the form of change in mindset and other benefits include skill development and personality development along with knowledge addition.	Intangible benefits include change in attitude, change in way of thinking and development of positive aspects in personality.	These can be measured by feeling a change in someone's overall behaviour and attitude.	The benefit is calculated over years together.	Short benefits include knowledge addition, Medium benefits include change in behaviour and long term benefits include making public relations better and winning more hearts.	It can increase the reputation of the organisation so that more funds get poured in it by the Govt.
10	Varies from programs to programs	Faculty payments including external faculties, distribution of training materials, training hall, food, tea etc and stay arrangements to participants if it is an in-house training program	It is very difficult to measure exactly the intangible costs and benefits	Learning, correcting the mistakes of the past, following the best practices being adopted by other discoms/states etc	knowledge updation of the trainee, career growth, when trained employees put on the job, the quality of work and efficiency will improve in Discom, which contributes to the development of power sector	Very difficult to measure exactly	It depends on the program	Knowledge updation, learning new things, relearning, and unlearning. When trained personnel do the work, the performance improves	

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11	Each program cost we can calculate	stationery,study material,tool kits ,lecture hall ,food honorarium teaching aids		when once we train a person .what he/she learned in class .it may he/she use in the field.with this it improves customer relation ship,technical skills ,work quality will improve	psychological changes will take place in participant.there is a small scope is there he/she feels this company is his/her company .attitude will change .seeing speaking regarding company will change.a trained person is asset to the organisation /society/nation.to get that much of experience it takes more time.	after training when we take feedback we can observe changes	we can get benefits after training .organisation should give training on new things in a phased manner frequently.when company is implementing/ inducting new things .it should give immediately.if it takes more time it may not get that much of benefit .train the participants those who are working on that particular area war foot basis.	there is no short term/medium /long term benefits always long term benefits only .	it needs 50-50. 50% practical 50% theory then only participants can get benefits .particularly our education system designed for theory more practical less .it is not advisable.for few things its advisable.for technical programs it is not advisable. we have to change our attitude .teaching methodology also we have to change.if time permit try to add more practical .4-wall class room methodology is not advisable.add more practical .then we can see new changes in work culture ,in organisation,in India.we can expect good workmen ship.
12		Lunch, tea, stationary, water, faculty remuneration, etc		Employees get promotion, their self esteem Is increased, motivated to work with interest	Increase in self esteem, CRM, and interest towards work	Growth in revenue and reduction in electrical accidents after training			Trainees come to know that even now some villages in their jurisdiction are unelectrified and work efficiently to electrify the villages.

SI No	CCT 1. Over what period of time cost is calculated? (word limit: 30-40 words)	CCT 2. What costs are incurred during training programmes? (word limit: 30-40 words)	CCT 3. How can we measure intangible costs?(word limit: 30-40 words)	CBT 1. What are the benefits of Training DISCOMs? (word limit: 30-40 words)	CBT 2. What are the intangible benefits of training in DISCOMs in general and for power sector? (word limit: 30-40 words)	CBT 3. How can we measure intangible benefits? (word limit: 30-40 words)	CBT 4. Over what period of time benefit is calculated? (word limit: 30-40 words)	CBT 5. What are the short, medium and long term benefits of training? (word limit: 30-40 words)	CBT 6. According to you what benefits can training framework bring in for rural electrification?(word limit: 30-40 words)
13	Cost of training is calculated on yearly basis	The cost incurred during the training programmes mainly includes cost of Resource person, food etc.	Intangible costs are not directly measured but it has certainly real impact on the performance of DISCOMs	The rate of accidents, failure of power and damage to machinery and equipment will be kept to the minimum by the well- trained employees. These will also lead to less cost of production per unit in case of generation.	Training helps the employees to do their jobs efficiently and also come up with better ways to go about their day-to-day tasks for making the DISCOMs profitable.	By measuring gains due to intangible and tangible benefits, the difference will be representing the value of the intangible benefits.	The benefit of training imparted to the employees can be calculated depending upon the short, medium and long term training	Short term training expand your knowledge without disrupting your work and long term training not only produce upskilled employees but also increased efficiency of the DISCOMs	Benefits of training brings Increased efficiency and quality of power with less outages.
14	One year	Faculty fee, training materials, food, etc.	Not measured	It improved the field performance, reduced accidents, created safety awareness among staff, technical upgradation etc.	Improved confidence, morale of staff. There by improved performance.	Quantum of consumer complaints,	One year	Quality improvement, conference, safety awareness etc.	Reduces accidents by safety awareness, improvement in quality of service
15	It should be after every month	It should be more than 1500 per employee	It can be identified but not quantified	It increases efficiency, less accidents& overall benefits	Increases efficiency	It can be identified but not quantified	Immediately	Efficiency, morals & increased growth	It changes a lot

Sl No	CCT 1. Over what period of time cost is calculated? (word limit: 30-40 words)	CCT 2. What costs are incurred during training programmes? (word limit: 30-40 words)	CCT 3. How can we measure intangible costs?(word limit: 30-40 words)	CBT 1. What are the benefits of Training DISCOMs? (word limit: 30-40 words)	CBT 2. What are the intangible benefits of training in DISCOMs in general and for power sector? (word limit: 30-40 words)	CBT 3. How can we measure intangible benefits? (word limit: 30-40 words)	CBT 4. Over what period of time benefit is calculated? (word limit: 30-40 words)	CBT 5. What are the short, medium and long term benefits of training? (word limit: 30-40 words)	CBT 6. According to you what benefits can training framework bring in for rural electrification?(word limit: 30-40 words)
16	CTC is calculated every month of a financial year	Training materials, Equipment, Stationary, Faculty Fee, Facility cost (Cost of food, refreshments,travel etc.), loss of productivity due to loss of work due to absence of employees during training	NA	Improved Organisational commitment and efficiency , Improved Employee satisfaction, Fewer errors, Decrease in safety violations, Increased Revenue, Improved communication and team work, Improved Customer satisfaction and reduction in complaints, Reduced conflicts and stress, Overall improvement in productivity	Improved Organisational commitment and efficiency , Improved Employee satisfaction, Fewer errors, Decrease in safety violations, Improved communication and team work, Improved Customer satisfaction and reduction in complaints, Reduced conflicts and stress, Overall improvement in productivity	By conducting a training program for selected employees and determining a reasonable rate for improved performance allows to calculate savings and identify changes in behaviour and attitude. Total anticipated savings can be calculated by dividing the amount of savings by number of trainees participated in the program.	Benefit is calculated every month of a financial year	Improved Organisational commitment and efficiency , Improved Employee satisfaction, Fewer errors, Decrease in safety violations, Increased Revenue, Improved communication and team work, Improved Customer satisfaction and reduction in complaints, Reduced conflicts and stress, Overall improvement in productivity	Improved Organisational commitment and efficiency , Improved Employee satisfaction, Fewer errors, Decrease in safety violations, Increased Revenue, Improved communication and team work, Improved Customer satisfaction and reduction in complaints, Reduced conflicts and stress, Overall improvement in productivity

Sl No	CCT 1. Over what period of time cost is calculated? (word limit: 30-40 words)	CCT 2. What costs are incurred during training programmes? (word limit: 30-40 words)	CCT 3. How can we measure intangible costs?(word limit: 30-40 words)	CBT 1. What are the benefits of Training DISCOMs? (word limit: 30-40 words)	CBT 2. What are the intangible benefits of training in DISCOMs in general and for power sector? (word limit: 30-40 words)	CBT 3. How can we measure intangible benefits? (word limit: 30-40 words)	CBT 4. Over what period of time benefit is calculated? (word limit: 30-40 words)	CBT 5. What are the short, medium and long term benefits of training? (word limit: 30-40 words)	CBT 6. According to you what benefits can training framework bring in for rural electrification?(word limit: 30-40 words)
17	Every financial year cost of training expenditure can be calculated through out discom.	Accomadation food coursematerial faculties honorarium Travelling expenses etc	Intangible cost cannot be quantified but can estimate such as employee morale company name etc	Training improves the efficiency of employees and educates easy working methods for the current trends	When the efficiency of Discoms improved.power sector ofThe country growth is also improves	We can survey the efficiency of Discoms after aggressive training	Period of three years	Short term benefits : Need based training improves technical developments medium term : Employees Attitude and morale changes in the management long term benefits: Financial improvements and consumer satisfaction	All Rural working staffs to be trained in a short period
18	Period of Time cost Calculations are based on estimates made	Reimbursement of Expenses incurred by Employee during training	an intangible cost is a cost that can be identified but can not be qualified or easily estimated	understanding the peoples capacity building in and clean energy proffolios	will do their job effectively and better with day to day tasks and more profitable	the process of elimination to assign quantitative values to intangible benefits after they achieved	time benefits are calculated after they implementation done by employees at DISCOMs end	the basis of data used is information during these trainings	First survey to be done then proper estimates to bring 100% electrification in rural areas
19	15-20 years	Faculty fee, training materials, food, etc.	It can be identified but not quantified	Decrease in safety violations, Increased Revenue, Improved communication and team work, Improved Customer satisfaction and reduction in complaints, Reduced conflicts and stress, Overall improvement in productivity	Overall System strengthening and skill strengthening	It can be identified but not quantified	Its a time consuming process	Improve in knowledge and productivity of employees there by reducing time for completion of work	Reduction in losses

Sl No	CCT 1. Over what period of time cost is calculated? (word limit: 30-40 words)	CCT 2. What costs are incurred during training programmes? (word limit: 30-40 words)	CCT 3. How can we measure intangible costs?(word limit: 30-40 words)	CBT 1. What are the benefits of Training DISCOMs? (word limit: 30-40 words)	CBT 2. What are the intangible benefits of training in DISCOMs in general and for power sector? (word limit: 30-40 words)	CBT 3. How can we measure intangible benefits? (word limit: 30-40 words)	CBT 4. Over what period of time benefit is calculated? (word limit: 30-40 words)	CBT 5. What are the short, medium and long term benefits of training? (word limit: 30-40 words)	CBT 6. According to you what benefits can training framework bring in for rural electrification?(word limit: 30-40 words)
20	every month	stationery,study material,tool kits ,lecture hall ,food honorarium teaching aids	Not measured	reduction of losses and up to date knowledge on trends and development in the sector.	.attitude will change .seeing speaking regarding company will change.a trained person is asset to the organisation /society/nation.to get that much of experience it takes more time.	Very difficult to measure exactly	It depends on the program	Short term improve confidence Medium term improve working skill of manpower Long term consumer satisfaction and truth for discom	Better service, More and faster productivity
21	Varies from programs to programs	Travel, Food, Accommodation, Stationary, Venue, Remuneration	Intangible cost for creating a brand name for the Institute is very difficult to measure.	increases efficiency,less accidents& overall benifits	Training helps the employees to do their jobs efficiently and also come up with better ways to go about their day-to-day tasks for making the DISCOMs profitable.	when we take feedback we can observe changes after training	one year	Short time:Improvement in working Medium Term:Reduction in fatalities Long Term:Desired improvement achieved	Benefits of training brings Increased efficiency and quality of power with less outages.
22	calculated on yearly basis	food, hospitality, technological advancement	Difficult to measure the intangible costs	Increase in performance, better relationships and smooth functioning of departments	Well trained employees	Number of safety incidents from last year and to current year. Improve in productivity also	5 years	Short term: feel good, increased belief, Medium term: increased performance, better co-ordination among staff, conflict management, Long term: feeling of fulfilment, becoming a leader and influencing others both in workplace and outside.	Well trained employees perform work safely

SI No	RM 1. What are the important measures of return on investment of Training? (Word limit: 30-40 words)	RM 2. How ROI methodology is useful for training Investment f DISCOMs for Rural Electrification? (Word limit: 30-40 words)	ET 1. What factors impact on the results of ROI? (Word limit: 30-40 words)	ET 2. How to isolate the effect of training? (Word limit: 30-40 words)
1	The cost of having a multi skilled workforce vs workforce with individuals of various disciplines , including time taken to restart the system in case of Failure can be quatig=fied to include economic loss saved of human life saved	RoI is an important parameter but if we start comparing the RoIs of Urban , Industrial and Rural Electricity sector the results will vary but these are equally important for the society, before it takes a shape of Rural vs Urban protests	Type of equipment on which training is to be provided, the basic knowledge level from where the training has to start and inputs provided accordingly	Normally the training gets imbedded in the mind of the training. Post Training and Pre Training data and perceptions of individuals and their supervisors (about the workforce with them) can help
2	KPIs	In any activity ROI is an important method to decide the investment. So, we have to measure both tangible and intangible benefits of training vs training investment.	Method of Measurement and It's Accuracy.	Same Employee Performance Before and After Training. Make Two Groups of Employees One Who Are Trained Other Not Trained. For The Same Parameter Measure Their Performance and Thus the Difference.
3	Higher productivity levels , higher ratings of consumer feedback, Discom ratings	For rural network development & expansion its important for employees to be upgraded to latest technologies, work procedures so that employee is high in morale his productivity & efficiency levels is high to meet deadlines & targets	Time, technology, Geographical area, political scenario, management systems	Providing necessary support systems, competent approvals, sufficient time , efficient team ,technology, healthy environment etc
4	Skill set of employees, Number of employees to be trained.	Overall AT&C loss reduction which further improved financial health of DISCOMs	Converting benefits to monetary data and then collecting and analysing them.	Control group on the trained employee's performance linked to KPI with trend line analysis and the expert estimation on performance of employee (Expert may be manager or leader of the employee)

5	All input cost of power and interest on borrowed funds	Calculable benefits due to training for a particular period divided by amount spent during that period on training will give ROI relating to training.	All cost components relating to training affects the ROI.	Very difficult to isolate.
6	More and satisfied customers bring more profits, Saving wastage of electricity and unnecessary costs			
7	cost involved in training of employees in any particular year for the utility as whole and the benefits derived by the corporation compared to pre and post training	Presently no significant methodology adopted	Some of the benefits of the training may accrue over a period of time	May be tried with training one segment and one cluster and compare the other circle in the same segment.
8	NA	NA	Employee turnover	Isolating the effect very difficult
9	The important measures of return include development of more skilled manpower with knowledge addition and development of a good work culture in any organisation.	When the quality training is provided by Rural Electrification, obviously more investment can be made by the DISCOMs towards Rural Electrification.	Skilled Faculty, greater investment on participants and better quality of training can impact ROI.	This can be done by making training institutes in Discoms.
10	Training fees is the major source. By making training programs at free of cost, it will also indirectly help to get new business.	As above	Training fees received, cost of conducting the training programs	Effect of the training can not be isolated
11	training is not investment.do not expect on it. a trained person is asset to the organisation/nation/self . add more skill oriented programs then we can see changes.			
12	Employees get promotions.			
13	Training requires time, money and resources and measures of return on investment includes increase in skills increased annual revenue and improvement in quality of power.	ROI methodology means the total investment divided by the annual savings, which is expressed in years. Further, the trainees are gaining new knowledge and skills so that they	Are trainees gaining new knowledge and skills so that they can increase efficiency at the workplace and measuring the cost of this training against the benefits to both the individuals and the organization?	It may happen that the department won't get as much money next year if we do not present some evidence that we are having a positive effect on desired goals with regard to respective training.

		can increase efficiency or reduce costs at the workplace		
14	Reduction of accident, improvement in revenue and reduction of administrative cost	Through improvement of quality of service	Improvement in performance, technical upgradation	Refreshment course may be included
15	Are the benefits out from the cost on training	During revenue realisation	Market power & better access to talent	Visualise efficiency, morals etc
16	Identifying the training needs of the organisation, Training benefits and Training Costs	ROI methodology can be used to justify the expense of training programs	Training benefits and Training Costs	By comparing the performance of each employee before and after training, impact on business before and after training
17	Repeated Training is the only measure	ROI Methodology is the one whether we can invest in Training or by other means	We have to analyse which field to be taken care by the results of ROI	BY Group discussions
18	trainees have actively participated what they learn in training can they apply in their workplace	return on investment in rural electrification is when it is 100% achievement done		
19	Maximum employees should get well trained	Calculable benefits due to training for a particular period divided by amount spent during that period on training will give ROI relating to training.	All cost components relating to training affects the ROI.	difficult to isolate.
20	Training fees is the major source. By making training programs at free of cost, it will also indirectly help to get new business.	Reduction in AT&C losses.	Benefits of the training may accrue over a period of time	This can be done by making training institutes in Discoms.
21	Input cost of power and interest on borrowed funds	Reduction in losses	Collection and analization is the key factor	impact on business before and after training
22	Overall improvement of employee as well as DISCOMs	During revenue realisation	cost components relating to training affects the ROI.	Isolating the effect very difficult

A3.2 INTERVIEW PROTOCOL RESPONSE CODE

THEMES	Sr. No	Question	Respondent 1	Respondent 2	Respondent 3	Respondent 4	Respondent 5	Respondent 6	Respondent 7	Respondent 8	Respondent 9	Respondent 10	Respondent 11
CCT	1	Over what period of time cost is calculated?	Training cost is budgeted for one year.	3 years	15 to 20 years	15	15-20 years	For Each programme duration of the programme (no of days) and manpower cost are involved from planning stage till completion of programme.	4-5 years	Over a financial year	Varies from programs to programs	Each program cost we can calculate	For Each programme duration of the programme (no of days) and man power cost involved from planning stage till completion of programme.
			Training, cost, budgeted, one year	3, year	15, 20, year	15	15, 20, years	each, programme, duration, manpower, cost, involved, planning, stage, completion	4, 5, year	financial, year	varies, program	program, cost, calculate	programme, duration, manpower, cost, planning, stage, completion
			5	1	2	0	0	8	2	1	1	1	0
	2	What costs are incurred during training programmes?	Direct cost i.e. training material, lodging and boarding, conveyance, etc. And indirect costs, i.e. staff salary, electricity, etc.	2 lakhs per annum in Odisha	1 to 1.35 lakh per batch	Around 1 Lakh per batch	Travel, Food, Accommodation, Stationary, Venue, Remuneration	Faculty remuneration, study material, study tour and Boarding and Lodging and man power associated with the programme	Training Exp	food, hospitality, technological advancement	Faculty payments including external faculties, distribution of training materials, training hall, food, tea etc and stay arrangements to participants if it is an in-house	stationery, study material, tool kits, lecture hall, food honorarium teaching aids	Lunch, tea, stationary, water, faculty remuneration, etc

											training program		
		direct, cost, training, material, lodging, boarding, conveyance, indirect, staff, salary, electricity	2, lakhs, per annum, odisha	1,1.35, lakh, per batch	1, lakh, per batch	Travel, Food, Accommodation, Stationary, Venue, Remuneration	Faculty remuneration, study material, study tour, Boarding, Lodging, man power, programme	Training Exp	hospitality, technological advancement	payments, external faculties, distribution, training, materials, hall, food, tea, stay, arrangements, participants, in-house, program	stationery, study, material, tool kits, lecture halls, food, honorarium, teaching, aids	lunch, tea, stationary, water, faculty, remuneration	
		11	4	3	0	6	3	1	2	5	5	4	
3	How can we measure intangible costs?	Intangible cost for creating a brand name for the Institute is very difficult to measure.	Not measured	Depends on type of course	Depends	Not measured	Apportionment of salary of all employees associated with programme, upkeep of campus and hostel, security, water and power cost general administration charges	Intangible costs are not directly measured but it has certainly real impact on the performance of DISCOMs	Cost of boarding, lodging and air travel of faculty , cost of refreshment of participants and cost of study material in both hard and soft copies, cost of photography and cost of tool kits provided while C&D level training.	It is very difficult to measure exactly the intangible costs and benefits	Depends	Intangible cost for creating a brand name for the Institute is very difficult to measure.	
		intangible, cost, creating, brand name, institute, difficult, measure	not, measured	depends, type, course	depends	not, measured	apportionment, salary, employees, associated, programme, upkeep, campus, hostel, security, water, power, cost, general, administration, charges	intangible, cost, not directly, measured, real impact, performance, DISCOMs	cost, boarding, lodging, air, travel, faculty, refreshment, participants, study, material, hard, soft, copies, photography, tool, kit, C&D, level, training	difficult, measure, intangible, cost, benefits	depends	intangible cost, creating, brand name, institute, difficult, measure	
		7	0	3	0	2	15	4	13	0	0	0	

THEME S	Sr . No	Question	Respondent 1	Respondent 2	Respondent 3	Respondent 4	Respondent 5	Respondent 6	Respondent 7	Respondent 8	Respondent 9	Respondent 10	Respondent 11
CBT	1	What are the benefits of Training DISCOMs?	Increase in day to day working efficiency of officers, reduction of transformer failure, reduction of accidents and thereby saving lives of field staff, better customer care, etc. are major benefits to DISCOMS.	Improve in productivity and safety of employees	Working skills improve, improving use of safety equipment which cause decrease in death rate in Discom	Employees are getting required safety information and other information which are required for the job.	Employee empowerment , increase in performance, better relationships and smooth functioning of departments	Safe operation and proper maintenance of the assets, improve the quality and duration of supply, reduction of losses and up to date knowledge on trends and development in the sector.	Increased work efficiency	The first benefit comes in the form of change in mindset and other benefits include skill development and personality development along with knowledge addition.	Learning, correcting the mistakes of the past, following the best practices being adopted by other discoms/states etc	when once we train a person .what he/she learned in class .it may he/she use in the field. with this it improves customer relationship, technical skills ,work quality will improve	Employees get promotion, their self esteem is increased, motivated to work with interest
			increase, day, working, efficiency, officers, reduction, transformer, failure, accidents, saving, lives, field, staff, better, customer, care, major, benefits, DISCOMS	Improve, productivity , safety, employees	working, skills, improve, use, safety, equipment, cause, decrease, death rate, DISCOM	employees, required, safety, information, job	employee, empowerment , increase, performance, better, relationships, smooth, functioning, departments	safe, operation, proper, maintenance, assets, improve, quality, duration, supply, reduction, losses, knowledge, trends, development, sector	increased, work, efficiency	first, benefit, form, mindset, skill, development , personality, knowledge, addition	learning, correcting, mistakes, past, following, best, practices, adopted, DISCOM, states	train, improves, customer, relationship, technical, skills, work, quality	employee, promotion, self esteem, increased, motivated, interest
				19	4	6	3	7	12	0	6	9	7

	2	What are the intangible benefits of training in DISCOMs in general and for power sector?	Training provides latest knowledge to the officers those got trained.DISCOMs get long run benefits which cannot be measured.	Improve in knowledge and productivity of employees there by reducing time for completion of work	Overall System strengthening and skill strengthening	Improvement in quality of work.	Employee happiness, balanced life, positive mindset and loyalty	Bridging the skill gap, meet the challenges in sector due to fast technical changes in generation (Solar and wind), grid integration and stability and IT enabled delivery system like Prepaid and smart metering and smart grid	Well trained employees	Intangible benefits include change in attitude, change in way of thinking and development of positive aspects in personality.	knowledge updation of the trainee, career growth, when trained employees put on the job, the quality of work and efficiency will improve in Discom, which contributes to the development of power sector	psychological changes will take place in participant.there is a small scope is there he/she feels this company is his/her company .attitude will change .seeing speaking regarding company will change.a trained person is asset to the organisation /society/nation.t o get that much of experience it takes more time.	Increase in self esteem, CRM, and interest towards work
			training, latest, knowledge, officer,trained, DISCOMs, long, run, benefits, cannot, measured	improve, knowledge, productivity , employee, reducing, time, completion	overall, system, strengthening, skill	improvement, quality, work	employee, happiness, balanced, life, positive, mindset, loyalty	bridging, skill gap, meet challenges, sector, fast, technical, changes, generation, solar, wind, grid, integration, stability, IT, enabled, delivery, system, prepaid, smart, metering	well, trained, employees	intangible, benefits, include, change, attitude, thinking, development , positive, aspects, personality	knowledge, updation, trainee, career, growth, trained, programme, job, quality, work, efficiency, improve, DISCOM, contributes, development, power, sector	psychological, participant, scope, company, attitude, trained, asset, society, nation, experience	increase, self, esteem, CRM, interest, work
			11	6	4	2	6	20	2	6	15	6	2

	3	How can we measure intangible benefits?	Intangible benefits to DISCOMs due to training can be measured tentatively by calculating the saving in T&D loss, reduction of transformer failure, reduction in accidents and it's financial implications .	Number of safety incidents from last year and to current year. Improve in productivity also	Yes from consumer end and employee manpower end	Overall satisfaction of consumers and employees	overall behaviour of staff and happy environment	reduction in outage, failure of transformers, improvement in quality and quantity of power supply, easy and low cost of delivery, reduction in accidents	It can be identified but not quantified	These can be measured by feeling a change in someone's overall behaviour and attitude.	Very difficult to measure exactly	after training when we take feedback we can observe changes	Growth in revenue and reduction in electrical accidents after training
			intangible, benefitis, DISCOMs, training, measured, tentatively, calculating, saving, T&D, loss, reduction, transformer, failure, reduction, accidents, financial ,implications	number, safety, incidents, last, year, current, improve, productivity	yes, consumer, end, employee, manpower	overall, satisfaction, consumers, employees	overall, behaviour, staff, happy, environment	reduction, outage, failure, transformers, improvement , quality, quantity, power,supply , easy, low, cost, delivery, accidents	identified, quantified	measured, feeling, chance, overall, behaviour, attitude	difficult, measure	training, feedback, observe, changes	growth, revenue, reduction, electrical, accidents, training
			17	8	5	2	4	9	2	3	1	4	4
	4	Over what period of time benefit is calculated?	Every year.	One year	Its a time consuming process	15 years	6-12months after training	Over a period of 4-5 year till technology changes or person undergoes change in role or new training	4-5 Years	The benefit is calculated over years together.	It depends on the program	we can get benefits after training .organisation should give training on new things in a phased manner frequently. When company is implementing/ inducting new things .it should give immediately. If it takes more time it may not get that much of benefit .train the	Over a period of 4-5 year till technology changes or person undergoes change in role or new training

											participants those who are working on that particular area war foot basis.	
		every, year	one, year	time, consuming, process	15, years	6, 12, months, training	over, period 4,5, year, technology, changes, person, undergoes, role, new, training	4,5, year	benefit, calculated, over, year, together	depends, program	benefits, training, organisation, frequently, implementing, participants, foot basis	over, period, 4,5, year, technology, changes, new, training
		2	1	3	1	4	10	0	3	2	3	0
	5	What are the short, medium and long term benefits of training?	Day to day efficiency due to training is the short term benefit where as increased profitability is the medium/long term benefit.	Improve in knowledge and productivity of employees there by reducing time for completion of work	Short term improve confidenceMedium term improve working skill of manpowerLong term consumer satisfaction and truth for DISCOMs	Short time: Improvement in working Medium Term:Reduction in fatalities Long Term:Desired improvement achieved	Short term: feel good, increased belief, Medium term: increased performance, better co-ordination among staff, conflict management, Long term: feeling of fulfilment, becoming a leader and influencing others both in workplace and outside.	Short term - immediate improvement in working areas, share the knowledge with others colleagues to improve their working and Organization will benefit as skill obtained will be useful for many employees by sharing f knowledge and experience	Increased work efficiency	Short benefits include knowledge addition, Medium benefits include change in behaviour and long term benefits include making public relations better and winning more hearts.	Knowledge updating, learning new things, relearning, and unlearning. When trained personnel do the work, the performance improves	there is no short term/medium /long term benefits always long term benefits only .

		day, efficiency, due, training, short, term, benefit, increased, profitability, medium, long, term, benefit	improve, knowledge, productivity, employee, reducing, time, completion	short, term, improve, confidence, medium, skill, manpower, long, consumer, satisfaction, truth, DISCOM	short, term, improvement, working, medium, reduction, fatalities, long, desired, achieved	short, term, feel, good, increased, performance, better, coordination, staff, conflict, management, long, feeling, fulfilment, becoming, leader, influencing, both, workplace, outside	short, term, immediate, improvement, working, areas, knowledge, colleagues, improve, organization, benefit, skill, obtained, useful, employees, experience	increased, work, efficiency	short, benefits, include, knowledge, addition, medium, change, behaviour, long, making, public, relations, better, winning, hearts	knowledge, updation, learning, new, things, relearning, unlearning, trained, personnel, performance, improve	short, medium, long, term, benefits	short, term, immediate, improvement, working, areas, knowledge, colleagues, improve, organization, benefit, skill, obtained, useful, employees, experience
		13	7	9	4	16	4	0	6	5	0	0
	6	According to you what benefits can training framework bring in for rural electrification ?	Training of officers of DISCOMs made the village electrification works faster in rural India and helped the DISCOMs to manage the situation better during natural calamities, i.e, cyclone,etc.	Improve in knowledge and productivity of employees there by reducing time for completion of work	Full utilization of all govt scheme, provide satisfactory SAIFI/SAIDI reports	Reduction in losses	Better service, More and faster productivity	The last mile connectivity in the value chain and most important in the link is distribution which is mostly rural areas are often neglected. If the quality and quantity is improved can contribute significantly to the state GDP as improvement in quality of life will lead to improved revenue to DISCOMs and pave way	Well trained employees perform work safely	It can increase the reputation of the organisation so that more funds get poured in it by the Govt.	All Rural working staffs to be trained in a short period to create a change	it needs 50-50. 50% practical 50% theory then only participants can get benefits .particularly our education system designed for theory more practical less .it is not advisable. For few things its advisable. For technical programs it is not advisable. we have to change our attitude .teaching methodology also we have to change.if time permit try to add more practical .4-wall class room methodology is

							of increase in small scale and MSME industries so that all utility, consumer and State will benefit.				not advisable.add more practical .then we can see new changes in work culture ,in organisation,in India.we can expect good workmen ship.	
		training, officers, DISCOMs, villages, electrification, works, faster, rural, India, DISCOMs, manage, situation, better, natural, calamities, cyclone	improve, knowledge, productivity , employee, reducing, time, completion	full, utilization, govt. scheme, provide, satisfactory, SAIFI, SAIDI, reports	reduction, losses	better, service, more, faster, productivity	last, mile, connectivity, value, chain, important, link, distribution, rural, areas, neglected, quality, quantity, improved, revenue, DISCOM, pave, way, increase, small, scale, MSME, industries, utility, consumer, state, benefit	well, trained, employee, perform, work, safely	Increase, reputation, organisation, funds, poured, govt.	rural, working, staffs, trained, short, period, change	50, practical, theory, participants, benefits, particularly, education, system, designed, practical, methodology, advisable, culture, workmen	trainees, villages, jurisdiction, unelectrified, work, efficiently,electrify
		16	7	8	2	4	20	6	5	2	12	7

THEMES	Sr. No	Question	Respondent 1	Respondent 2	Respondent 3	Respondent 4	Respondent 5	Respondent 6	Respondent 7	Respondent 8	Respondent 9	Respondent 10	Respondent 11
RM	1	What are the important measures of return on investment of Training?	All input cost of power and interest on borrowed funds	Analysis of the pre and post training improvement of employees	Overall improvement of employee as well as Discom	Maximum employees should get well trained	More and satisfied customers bring more profits, Saving wastage of Electricity and unnecessary costs	cost involved in training of employees in any particular year for the utility as whole and the benefits derived by the corporation compared to pre and post training	When the quality training is provided by Rural Electrification, obviously more investment can be made by the Discoms towards Rural Electrification.	The important measures of return include development of more skilled manpower with knowledge addition and development of a good work culture in any organisation.	Training fees is the major source. By making training programs at free of cost, it will also indirectly help to get new business.	training is not investment.do not expect on it.a trained person is asset to the organisation/nation/self .add more skill oriented programs then we can see changes.	Employees get promotions.
			input, cost, power, interest, borrowed, funds	analysis, pre, post, training, improvement, employees	overall, improvement, employee, DISCOMs	maximum, employees, get, trained	more, satisfied, customers, more, profits, saving, wastage, electricity, unnecessary, costs	cost, involved, training, employees, utility, whole, benefits, derived, corporation, compared, pre, post, training	quality, training, rural, electrification, investment, DISCOMs	important, measures, return, include, development, more,skilled, manpower, knowledge, addition, development, good, work, culture, organisation	fees, major, source, making, training, program, free, cost, indirectly, help, business	training, investment, trained, asset, organisation, naton, self, add, skill, oriented, program	employees, promotion
			6	6	2	2	10	8	0	12	9	4	0
	2	How ROI methodology is useful for training Investment f DISCOMs for Rural Electrification	Calculable benefits due to training for a perticular period divided by amount spent during that period on training will give ROI relating to training.	Analysis will improve the training methodology and framework	Reduction in losses	Reduction in AT&C losses.	During revenue realisation	Presently no significant methodology adopted	NA	When the quality training is provided by Rural Electrification, obviously more investment can be made by the Discoms towards Rural Electrification.	Through improvement of quality of service	Reduction in losses	Calculable benefits due to training for a perticular period divided by amount spent during that period on training will give ROI relating to training.

			calculable, benefits, training, particular, period, divided, amount, spent, period, training, ROI, training	analysis, improve, training, methodology, framework	reduction, losses	reduction, AT&C losses	revenue, realisation	presently, no, significant, methodology, adopted	NA	quality, training, provided, rural, electrification, obviously, more, investment, DISCOMs, rural, electrification	improvement, quality, service	reduction, losses	calculable, benefits, training, particular, period, divided, amount, ROI
			12	4	2	0	2	2	0	6	1	0	4

THEMES	Sr. No	Question	Respondent 1	Respondent 2	Respondent 3	Respondent 4	Respondent 5	Respondent 6	Respondent 7	Respondent 8	Respondent 9	Respondent 10	Respondent 11
ET	1	What factors impact on the results of ROI?	All cost components relating to training affects the ROI.		Collection and analization is the key factor	Monetary data to be analysed	Training fees received, cost of conducting the training programs	Some of the benefits of the training may accrue over a period of time	Employee turnover	Skilled Faculty, greater investment on participants and better quality of training can impact ROI.	Training fees received, cost of conducting the training programs	Monetary data to be analysed	All cost components relating to training affects the ROI.
			All, cost, components, relating, training, effects, ROI		collection, analization, key, factor	monetary, data, analysed	training, fees, conducting, training, program	benefits, training, accrue, over, period, time	employee, turnover	skilled, faculty, greater, investment, participants, better, quality, training, impact, ROI	training, fees, received, cost, conducting, training, programs	monetary, data, analysed	All, cost, components, relating, training, effects, ROI
			7	0	4	2	4	6	2	6	4	0	0

	2	How to isolate the effect of training?	Very difficult to isolate.		Control groups are arguably the most accurate way to isolate the impact of training as a comparison is made between the performance of your training group and the performance of a group that haven't received training	KPI points to be considered	This can be done by making training institutes in Discoms.	May be tried with training one segment and one cluster and compare the other circle in the same segment.	Isolating the effect very difficult	This can be done by making training institutes in Discoms.	Effect of the training can not be isolated	KPI points to be considered	Very difficult to isolate.
			very, difficult, isolate		control, groups, arguably, most, accurate, isolate, impact, training, comparison, between, performance, received, training	KPI, points, considered	training, institute, DISCOMs	tried, training, one, segment, cluster, compare, other, circle, same	isolating, effect, very, difficult	making, training, industries, DISCOMs	effect, training, cannot, isolated	KPI, points, considered	very, difficult, isolate
			3	0	12	3	2	8	1	2	0	0	0

Similarly, for respondent 12-22

THEMES	Sr. No	Question	Respondent 12	Respondent 13	Respondent 14	Respondent 15	Respondent 16	Respondent 17	Respondent 18	Respondent 19	Respondent 20	Respondent 21	Respondent 22
CCT	1	Over what period of time cost is calculated?	Cost of training is calculated on yearly basis	One year	It should be after every month	CTC is calculated every month of a financial year	Every financial year cost of training expenditure can be calculated through out discom.	Period of Time cost Calculations are based on estimates made	one year	15-20 years	every month	Varies from programs to programs	calculated on yearly basis
			cost, training, calculated, yearly, basis	one, year	every, month	CTC, calculated, every, month, financial	every, financial, year, cost, training, expenditure, calculated, DISCOM	Period, time, cost, calculation, estimates	one, year	15, 20, years	every, month	varies, program	calculated, yearly, basis
			1	0	0	2	2	2	0	0	0	0	0
	2	What costs are incurred during training programmes?	The cost incurred during the training programmes mainly includes cost of topic delivered by Resource person, food etc.	Faculty fee, training materials, food, etc.	It should be more than 1500 per employee	Training materials, Equipment, Stationary, Faculty Fee, Facility cost (Cost of food, refreshments,travel etc.), loss of productivity due to loss of work due to absence of employees during training	Accomadation food coursematerial faculties honorarium Travelling expenses etc	Reimbursement of Expenses incurred by Employee during training	travel, accomodation, remuneration, stationery	Faculty fee, training materials, food, etc.	stationery,study material,tool kits ,lecture hall ,food honorarium teaching aids	Travel, Food, Accommodation, Stationary, Venue, Remuneration	food, hospitality, technological advancement

		cost, incurred, training, programme, resource, tool	faculty fee, training, food	1500, employee	training, equipment, stationary, faculty, fee, cost, loss, productivity, absence, employee	accommodation, food, course material, faculties, honorarium, travelling, expenses	reimbursement, expenses, incurred, employee, training	travel, accommodation, remuneration, stationery	faculty fee, training, food	stationery, study, material, tool kits, lecture halls, food, honorarium, teaching, aids	Travel, Food, Accommodation, Stationary, Venue, Remuneration	hospitality, technological advancement
		4	3	2	2	5	3	0	0	0	0	0
3	How can we measure intangible costs?	Intangible costs are not directly measured but it has certainly real impact on the performance of DISCOMs	Not measured	It can be identified but not quantified	Apportionment of salary of all employees associated with programme, upkeep of campus and hostel, security, water and power cost general administration charges	Intangible costs cannot be quantified but can estimate, such as employee morale, company name etc	an intangible cost is a cost that can be identified but can not be qualified or easily estimated	Not measured	It can be identified but not quantified	Not measured	Intangible cost for creating a brand name for the Institute is very difficult to measure.	Difficult to measure the intangible costs
		intangible cost, directly, impact, performance, DISCOMs	not, measured	identified, not, qualified	apportionment, salary, employee, programme, upkeep, campus, hostel, security, water, power cost, general, administration, changes	intangible, cost, cannot, quantified, estimate, employee, morale, company	intangible, cost, identified, qualified, easily, estimated	Not measured	identified, not, qualified	not, measured	intangible cost, creating, brand name, institute, difficult, measure	difficult, measure, intangible, cost
		4	1	1	14	2	0	0	0	0	0	0

THEME S	Sr . No	Question	Respondent 12	Respondent 13	Respondent 14	Respondent 15	Respondent 16	Respondent 17	Respondent 18	Respondent 19	Respondent 20	Respondent 21	Respondent 22
CBT	1	What are the benefits of Training DISCOMs?	The rate of accidents, failure of power and damage to machinery and equipment will be kept to the minimum by the well-trained employees. These will also lead to less cost of production per unit in case of generation.	It improved the field performance, reduced accidents, created safety awareness among staff, technical upgradation etc.	It increases efficiency, less accidents & overall benefits	Improved Organisational commitment and efficiency , Improved Employee satisfaction, Fewer errors, Decrease in safety violations, Increased Revenue, Improved communication and team work, Improved Customer satisfaction and reduction in complaints, Reduced conflicts and stress, Overall improvement in productivity	Training improves the efficiency of employees and educates easy working methods for the current trends	understanding the peoples capacity building in and clean energy portfolios	It increases efficiency, less accidents & overall benefits	Decrease in safety violations, Increased Revenue, Improved communication and team work, Improved Customer satisfaction and reduction in complaints, Reduced conflicts and stress, Overall improvement in productivity	reduction of losses and up to date knowledge on trends and development in the sector.	increases efficiency, less accidents & overall benefits	Increase in performance , better relationships and smooth functioning of departments
			rate, accidents, failure, power, damage, machinery, equipment, minimum, well-trained, employees, less, cost, production, generation	improved, field, performance, reduced, accidents, safety, awareness, staff, technical, upgradation	increases, efficiency, less accidents, overall, benefits	improved, organisational, commitment, efficiency, improved, employee, satisfaction, fewer, errors, decrease, safety, violation, revenue, communication, teamwork, customer, satisfaction, reduction, conflicts,	training, improves, efficiency, employees, educates, methods, current, trends	capacity, building, clean, energy, portfolios	Increases, efficiency, benefits	decrease, safety, violation, revenue, communication, teamwork, customer, satisfaction, reduction, conflicts, stress, productivity	reduction, losses, knowledge, trends, development, sector	increases, efficiency, less accidents, overall, benefits	increase, performance , better, relationships, smooth, functioning, departments

					stress, productivity								
		12	10	3	20	4	1	0	0	0	0	0	0
2	What are the intangible benefits of training in DISCOMs in general and for power sector?	Training helps the employees to do their jobs efficiently and also come up with better ways to go about their day-to-day tasks for making the DISCOMs profitable.	Improved confidence, morale of staff. There by improved performance.	Increases efficiency	Improved Organisational commitment and efficiency , Improved Employee satisfaction, Fewer errors, Decrease in safety violations, Increased Revenue, Improved communication and team work, Improved Customer satisfaction and reduction in complaints, Reduced conflicts and stress, Overall improvement in productivity	When the efficiency of Discoms improved.power sector ofThe country growth is also improves	will do their job effectively and better with day to day tasks and more profitable	Increases efficiency	Overall System strengthening and skill strengthening	.attitude will change .seeing speaking regarding company will change.a trained person is asset to the organisation /society/nation.t o get that much of experience it takes more time.	Training helps the employees to do their jobs efficiently and also come up with better ways to go about their day-to-day tasks for making the DISCOMs profitable.	Well trained employees	
		training, employees, jobs,efficiency, better, ways, day-to-day, DISCOMs, profitable	improved, confidence, morale, staff, performance	increases, efficiency	improved, organisational, commitment, efficiency, improved, employee, satisfaction, fewer, errors, decrease, safety, violation, revenue, communication, teamwork, customer,	efficiency, DISCOMs, improved, power, sector, country, growth	job, effectively, better, tasks, profitable	efficiency	overall, system, strengthening, skill	attitude, trained, asset, society, nation, experience	training, employees, jobs,efficiency, better, ways, day-to-day, DISCOMs, profitable	well, trained, employees	

					satisfaction, reduction, conflicts, stress, productivity								
		4	2	2	15	4	4	0	0	0	0	0	0
3	How can we measure intangible benefits?	By measuring gains due to intangible and tangible benefits, the difference will be representing the value of the intangible benefits.	Quantum of consumer complaints,	It can be identified but not quantified	By conducting a training program for selected employees and determining a reasonable rate for improved performance allows to calculate savings and identify changes in behaviour and attitude. Total anticipated savings can be calculated by dividing the amount of savings by number of trainees participated in the program.	We can survey the efficiency of Discoms after aggressive training	the process of elimination to assign quantitative values to intangible benefits after they achieved	It can be identified but not quantified	It can be identified but not quantified	Very difficult to measure exactly	when we take feedback we can observe changes after training	Number of safety incidents from last year and to current year. Improve in productivity also	
		measuring, gains, intangible, tangible, benefits, value	quantum, consumer, complaints	identified, quantified	conducting, training, program, selected, employee, reasonable, improved, performance, calculate, savings,	survey, efficiency, DISCOMs, aggressive, training	process, elimination, assign, quantitative, intangible, benefits, achieved	identified, quantified	identified, quantified	difficult, measure	feedback, observe, changes, training,	number, safety, incidents, last, year, current, improve, productivity	

					identify, behaviour, attitude, anticipated, amount, trainees								
		3	2	2	8	4	5	0	0	0	0	0	0
4	Over what period of time benefit is calculated?	The benefit of training imparted to the employees can be calculated depending upon the short, medium and long term training	One year	Immediately	Benefit is calculated every month of a financial year	Period of three years	time benefits are calculated after they implementation done by employees at DISCOMs end	One year	Its a time consuming process	It depends on the program	one year	5 years	
		benefit, training, imparted, employees, calculated short, medium, long, training	one, year	immediately	benefit, calculated every, month, financial	period, three, years	time, benefit, calculated, implemented, employees, DISCOMs	one, year	time, consuming, process	depends, program	one, year	5, years	
		8	0	0	3	2	4	0	0	0	0	0	0

	5	What are the short, medium and long term benefits of training?	Short term training expand your knowledge without disrupting your work and long term training not only produce upskilled employees but also increased efficiency of the DISCOMs	Quality improvement, conference, safety awareness etc.	Efficiency, morals & increased growth	Improved Organisational commitment and efficiency, Improved Employee satisfaction, Fewer errors, Decrease in safety violations, Increased Revenue, Improved communication and teamwork, Improved Customer satisfaction and reduction in complaints, Reduced conflicts and stress, Overall improvement in productivity	Short term benefits : Need based training improves technical developments medium term : Employees Attitude and morale changes in the management long term benefits: Financial improvements and consumer satisfaction	the basis of data used is information during these trainings	Improved knowledge, Improved skill, reduced outages,	Improve in knowledge and productivity of employees there by reducing time for completion of work	Short term improve confidence Medium term improve working skill of manpower Long term consumer satisfaction and truth for DISCOM	Short time:Improvement in working Medium Term:Reduction in fatalities Long Term:Desired improvement achieved	Short term: feel good, increased belief, Medium term: increased performance, better coordination among staff, conflict management, Long term: feeling of fulfilment, becoming a leader and influencing others both in workplace and outside.
			short, term, training, expand, knowledge, disrupting, training, produce, upskilled, employee	quality, improvement, conference, safety, awareness	efficiency, morals, increased, growth	improved, organisational, commitment, efficiency, improved, employee, satisfaction, fewer, errors, decrease, safety, violation, revenue, communication, teamwork, customer, satisfaction, reduction, conflicts, stress, productivity	short, term, benefit, need, training, improves, technical, development, medium, attitude, morale, changes, management, long, financial, improvements, consumer, satisfaction	basis, data, information, training	Improved, knowledge, skill, reduced, outages	improve, knowledge, productivity, employee, reducing, time, completion	short, term, improve, confidence, medium, skill, manpower, long, consumer, satisfaction, truth, DISCOM	short, term, improvement, working, medium, reduction, fatalities, long, desired, achieved	short, term, feel, good, increased, performance, better, coordination, staff, conflict, management, long, feeling, fulfilment, becoming, leader, influencing, both, workplace, outside
			8	5	2	15	10	2	0	0	0	0	0

	6	According to you what benefits can training framework bring in for rural electrification ?	Benefits of training brings Increased efficiency and quality of power with less outages.	Reduces accidents by safety awareness, improvement in quality of service	It changes a lot	Improved Organisational commitment and efficiency , Improved Employee satisfaction, Fewer errors, Decrease in safety violations, Increased Revenue, Improved communication and teamwork, Improved Customer satisfaction and reduction in complaints, Reduced conflicts and stress, Overall improvement in productivity	All Rural working staffs to be trained in a short period	First survey to be done then proper estimates to bring 100% electrification in rural areas	It changes a lot	Reduction in losses	Better service, More and faster productivity	Benefits of training brings Increased efficiency and quality of power with less outages.	Well trained employees perform work safely
			benefits, training, increased, efficiency, quality, power, less, outages	reduces, accidents, safety, awareness, improvement, quality, service	changes	improved, organisational, commitment, efficiency, improved, employee, satisfaction, fewer, errors, decrease, safety, violation, revenue, communication, teamwork, customer, satisfaction, reduction, conflicts, stress, productivity	rural, working, staffs, trained, short, period	first, survey, estimates, electrification, rural, areas	change	reduction, losses	better, service, more, faster, productivity	benefits, training, increased, efficiency, quality, power, less, outages	well, trained, employee, perform, work, safely
			6	4	1	14	4	2	1	0	0	0	0

THEME S	Sr . No	Question	Respondent 12	Respondent 13	Respondent 14	Respondent 15	Respondent 16	Respondent 17	Respondent 18	Respondent 19	Respondent 20	Respondent 21	Respondent 22
			4	1	1	14	2	0	0	0	0	0	0
CBT	1	What are the benefits of Training DISCOMs?	The rate of accidents, failure of power and damage to machinery and equipment will be kept to the minimum by the well-trained employees. These will also lead to less cost of production per unit in case of generation.	It improved the field performance, reduced accidents, created safety awareness among staff, technical upgradation etc.	It increases efficiency, less accidents & overall benefits	Improved Organisational commitment and efficiency , Improved Employee satisfaction, Fewer errors, Decrease in safety violations, Increased Revenue, Improved communication and team work, Improved Customer satisfaction and reduction in complaints, Reduced conflicts and stress, Overall improvement in productivity	Training improves the efficiency of employees and educates easy working methods for the current trends	understanding the peoples capacity building in and clean energy portfolios	It increases efficiency, less accidents & overall beifits	Decrease in safety violations, Increased Revenue, Improved communication and team work, Improved Customer satisfaction and reduction in complaints, Reduced conflicts and stress, Overall improvement in productivity	reduction of losses and up to date knowledge on trends and development in the sector.	increases efficiency, less accidents & overall benefits	Increase in performance , better relationships and smooth functioning of departments
			rate, accidents, failure, power, damage, machinery, equipment, minimum, well-trained, employees, less, cost, production, generation	improved, field, performance, reduced, accidents, safety, awareness, staff, technical, upgradation	increases, efficiency, less accidents, overall, benefits	improved, organisational, commitment, efficiency, improved, employee, satisfaction, fewer, errors, decrease, safety, violation, revenue, communication, teamwork, customer,	training, improves, efficiency, employees, educates, methods, current, trends	capacity, building, clean, energy, portfolios	Increases, efficiency, benefits	decrease, safety, violation, revenue, communication, teamwork, customer, satisfaction, reduction, conflicts, stress, productivity	reduction, losses, knowledge, trends, development, sector	increases, efficiency, less accidents, overall, benefits	increase, performance , better, relationships, smooth, functioning, departments

					satisfaction, reduction, conflicts, stress, productivity								
		12	10	3	20	4	1	0	0	0	0	0	0
2	What are the intangible benefits of training in DISCOMs in general and for power sector?	Training helps the employees to do their jobs efficiently and also come up with better ways to go about their day-to-day tasks for making the DISCOMs profitable.	Improved confidence, morale of staff. There by improved performance.	Increases efficiency	Improved Organisational commitment and efficiency , Improved Employee satisfaction, Fewer errors, Decrease in safety violations, Increased Revenue, Improved communication and team work, Improved Customer satisfaction and reduction in complaints, Reduced conflicts and stress, Overall improvement in productivity	When the efficiency of Discoms improved.power sector ofThe country growth is also improves	will do their job effectively and better with day to day tasks and more profitable	Increases efficiency	Overall System strengthening and skill strengthening	.attitude will change .seeing speaking regarding company will change.a trained person is asset to the organisation /society/nation.t o get that much of experiece it takes more time.	Training helps the employees to do their jobs efficiently and also come up with better ways to go about their day-to-day tasks for making the DISCOMs profitable.	Well trained employees	
		training, employees, jobs,efficiency, better, ways, day-to-day, DISCOMs, profitable	improved, confidence, morale, staff, performance	increases, efficiency	improved, organisational, commitment, efficiency, improved, employee, satisfaction, fewer, errors, decrease, safety, violation, revenue, communicatio	efficiency, DISCOMs, improved, power, sector, country, growth	job, effectively, better, tasks, profitable	efficiency	overall, system, strengthening, skill	attitude, trained, asset, society, nation, experience	training, employees, jobs,efficiency, better, ways, day-to-day, DISCOMs, profitable	well, trained, employees	

					n, teamwork, customer, satisfaction, reduction, conflicts, stress, productivity								
		4	2	2	15	4	4	0	0	0	0	0	0
3	How can we measure intangible benefits?	By measuring gains due to intangible and tangible benefits, the difference will be representing the value of the intangible benefits.	Quantum of consumer complaints,	It can be identified but not quantified	By conducting a training program for selected employees and determining a reasonable rate for improved performance allows to calculate savings and identify changes in behaviour and attitude. Total anticipated savings can be calculated by dividing the amount of savings by number of trainees participated in the program.	We can survey the efficiency of DISCOMs after aggressive training	the process of elimination to assign quantitative values to intangible benefits after they achieved	It can be identified but not quantified	It can be identified but not quantified	Very difficult to measure exactly	when we take feedback we can observe changes after training	Number of safety incidents from last year and to current year. Improve in productivity also	
		measuring, gains, intangible, tangible, benefits, value	quantum, consumer, complaints	identified, quantified	conducting, training, program, selected, employee, reasonable, improved, performance, calculate, savings, identify, behaviour,	survey, efficiency, DISCOMs, aggressive, training	process, elimination, assign, quantitative, intangible, benefits, achieved	identified, quantified	identified, quantified	difficult, measure	feedback, observe, changes, training,	number, safety, incidents, last, year, current, improve, productivity	

					attitude, anticipated, amount, trainees								
		3	2	2	8	4	5	0	0	0	0	0	0
4	Over what period of time benefit is calculated?	The benefit of training imparted to the employees can be calculated depending upon the short, medium and long term training	One year	Immediately	Benefit is calculated every month of a financial year	Period of three years	time benefits are calculated after they implementation done by employees at DISCOMs end	One year	Its a time consuming process	It depends on the program	one year	5 years	
		benefit, training, imparted, employees, calculated short, medium, long, training	one, year	immediately	benefit, calculated every, month, financial	period, three, years	time, benefit, calculated, implemented, employees, DISCOMs	one, year	time, consuming, process	depends, program	one, year	5, years	
		8	0	0	3	2	4	0	0	0	0	0	0
5	What are the short, medium and long term benefits of training?	Short term training expand your knowledge without disrupting your work and long term training not only produce upskilled employees but also increased efficiency of the DISCOMs	Quality improvement, conference, safety awareness etc.	Efficiency, morals & increased growth	Improved Organisational commitment and efficiency, Improved Employee satisfaction, Fewer errors, Decrease in safety violations, Increased Revenue, Improved communication and team work, Improved	Short term benefits : Need based training improves technical developments medium term : Employees Attitude and morale changes in the management long term benefits: Financial improvements and consumer satisfaction	the basis of data used is information during these trainings	Improved knowledge, Improved skill, reduced outages,	Improve in knowledge and productivity of employees there by reducing time for completion of work	Short term improve confidence Medium term improve working skill of manpower Long term consumer satisfaction and truth for discom	Short time:Improvement in working Medium Term:Reduction in fatalities Long Term:Desired improvement achieved	Short term: feel good, increased belief, Medium term: increased performance, better co-ordination among staff, conflict management, Long term: feeling of fulfilment, becoming a	

					Customer satisfaction and reduction in complaints, Reduced conflicts and stress, Overall improvement in productivity							leader and influencing others both in workplace and outside.
		short, term, training, expand, knowledge, disrupting, training, produce, upskilled, employee	quality, improvement, conference, safety, awareness	efficiency, morals, increased, growth	improved, organisational, commitment, efficiency, improved, employee, satisfaction, fewer, errors, decrease, safety, violation, revenue, communication, teamwork, customer, satisfaction, reduction, conflicts, stress, productivity	short, term, benefit, need, training, improves, technical, development, medium, attitude, morale, changes, management, long, financial, improvements, consumer, satisfaction	basis, data, information, training	Improved, knowledge, skill, reduced, outages	improve, knowledge, productivity, employee, reducing, time, completion	short, term, improve, confidence, medium, skill, manpower, long, consumer, satisfaction, truth, DISCOM	short, term, improvement, working, medium, reduction, fatalities, long, desired, achieved	short, term, feel, good, increased, performance, better, co-ordination, staff, conflict, management, long, feeling, fulfilment, becoming, leader, influencing, both, workplace, outside
		8	5	2	15	10	2	0	0	0	0	0

	6	According to you what benefits can training framework bring in for rural electrification ?	Benefits of training brings Increased efficiency and quality of power with less outages.	Reduces accidents by safety awareness, improvement in quality of service	It changes a lot	Improved Organisational commitment and efficiency , Improved Employee satisfaction, Fewer errors, Decrease in safety violations, Increased Revenue, Improved communication and teamwork, Improved Customer satisfaction and reduction in complaints, Reduced conflicts and stress, Overall improvement in productivity	All Rural working staffs to be trained in a short period	First survey to be done then proper estimates to bring 100% electrification in rural areas	It changes a lot	Reduction in losses	Better service, More and faster productivity	Benefits of training brings Increased efficiency and quality of power with less outages.	Well trained employees perform work safely
			benefits, training, increased, efficiency, quality, power, less, outages	reduces, accidents, safety, awareness, improvement, quality, service	changes	improved, organisational, commitment, efficiency, improved, employee, satisfaction, fewer, errors, decrease, safety, violation, revenue, communication, teamwork, customer, satisfaction, reduction, conflicts, stress, productivity	rural, working, staffs, trained, short, period	first, survey, estimates, electrification, rural, areas	change	reduction, losses	better, service, more, faster, productivity	benefits, training, increased, efficiency, quality, power, less, outages	well, trained, employee, perform, work, safely
			6	4	1	14	4	2	1	0	0	0	0

THEMES	Sr. No	Question	Respondent 12	Respondent 13	Respondent 14	Respondent 15	Respondent 16	Respondent 17	Respondent 18	Respondent 19	Respondent 20	Respondent 21	Respondent 22
RM	1	What are the important measures of return on investment of Training?	Training requires time , money and resources and measures of return on investment includes increase in skills increased annual revenue and improvement in quality of power.	Reduction of accident, improvement in revenue and reduction of administrative cost	Are the benefits out from the cost on training	Identifying the training needs of the organisation, Training benefits and Training Costs	Repeated Training is the only measure	trainees have actively participated what they learn in training can they apply in their workplace	When the quality training is provided by Rural Electrification, obviously more investment can be made by the DISCOMs towards Rural Electrification.	Maximum employees should get well trained	Training fees is the major source. By making training programs at free of cost, it will also indirectly help to get new business.	Input cost of power and interest on borrowed funds	Overall improvement of employee as well as Discom
			training, require, time, money, resources, measures, return, investment, annual, revenue, quality, power	reduction, accident, improvement, revenue, reduction, administrative, cost	benefits, cost, training,	identifying, training, organisation, benefit, cost	repeated, training, measure	trainees, actively, participated, apply, workplace	quality, training, rural, electrification, investment, DISCOMs	maximum, employees, get, trained	fees, major, source, making, training, program, free, cost, indirectly, help, business	input, cost, power, interest, borrowed, funds	overall, improvement, employee, DISCOMs
			7	2	0	1	1	2	0	0	0	0	0

	2	How ROI methodology is useful for training Investment f DISCOMs for Rural Electrification	ROI methodology means the total investment divided by the annual savings, which is expressed in years. Further, the trainees are gaining new knowledge and skills so that they can increase efficiency or reduce costs at the workplace	Through improvement of quality of service	During revenue realisation	ROI methodology can be used to justify the expense of training programs	ROI Methodology is the one whether we can invest in Training or by other means	return on investment in rural electrification is when it is 100% achievement done	During revenue realisation	Calculable benefits due to training for a particular period divided by amount spent during that period on training will give ROI relating to training.	Reduction in AT&C losses.	Reduction in losses	During revenue realisation
			ROI, methodology, investment, divided, annual, savings, expressed, gaining, knowledge, skills, increase, efficiency, reduce, costs, workplace	improvement, quality, service	revenue, realisation	ROI, methodology, justify, expense, training, program	ROI, methodology, invest, training	return, investment, rural, electrification, achievement	revenue, realisation	calculable, benefits, training, particular, period, divided, amount, spent, period, training, ROI, training	reduction, AT&C losses	reduction, losses	revenue, realisation
			9	2	2	5	0	2	0	0	0	0	0

THEMES	Sr. No	Question	Respondent 12	Respondent 13	Respondent 14	Respondent 15	Respondent 16	Respondent 17	Respondent 18	Respondent 19	Respondent 20	Respondent 21	Respondent 22
ET	1	What factors impact on the results of ROI?	Are trainees gaining new knowledge and skills so that they can increase efficiency at the workplace and measuring the cost of this training against the	Improvement in performance, technical upgradation	Market power & better access to talent	Training benefits and Training Costs	We have to analyze which field to be taken care by the results of ROI	Some of the benefits of the training may accrue over a period of time	Training fees received, cost of conducting the training programs	All cost components relating to training affects the ROI.	Benefits of the training may accrue over a period of time	Collection and analization is the key factor	cost components relating to training affects the ROI.

		benefits to both the individuals and the organization?										
		trainees, knowledge, skills, increase, efficiency, workplace, measuring, cost, training, benefits, individuals, organization	improvement, performance, technical, upgradation	market, power, better, access, talent	training, benefits, cost	analyze, field, results, ROI	benefits, training, accrue, over, period, time	training, fees, conducting, training, program	All, cost, components, relating, training, effects, ROI	benefits, training, accrue, over, period, time	collection, analization, key, factor	cost, components, relating, training, effects, ROI
		6	2	5	0	0	0	0	0	0	0	0
2	How to isolate the effect of training?	It may happen that the department won't get as much money next year if we do not present some evidence that we are having a positive effect on desired goals with regard to respective training.	Refreshment course may be included	Visualise efficiency, morals etc	By comparing the performance of each employee before and after training, impact on business before and after training	BY Group discussions	May be tried with training one segment and one cluster and compare the other circle in the same segment.	May be tried with training one segment and one cluster and compare the other circle in the same segment.	difficult to isolate.	This can be done by making training institutes in Discoms.	impact on business before and after training	Isolating the effect very difficult
		department, money, present, evidence, positive, effect, desired, goals, respective	refreshment, course, included	visualise, efficiency, morals	comparing, performance, employee, training, impact, business, before, after	group, discussion	tried, training, one, segment, cluster, compare, other, circle, same	tried, training, one, segment, cluster, compare, other, circle, same	difficult, isolate	training, institute, DISCOMs	impact, business, before, after, training	isolating, effect, very, difficult
		6	2	2	4	1	0	0	0	0	0	0

Calculation of cost of Training (CCT)

Ques 1: Over what period of time cost is calculated?

Respondents	Codes generated	Count
1	Training, cost, budgeted, one, year	Code Quantity: 5, New Code:5
2	3, year	Code Quantity: 2, New Code: 1
3	15, 20, year	Code Quantity: 3, New Code: 2
4	15	Code Quantity: 1, New Code: 0
5	15, 20, years	Code Quantity: 3, New Code: 0
6	each, programme, duration, manpower, cost, involved, planning, stage, completion	Code Quantity: 9, New Code: 8
7	4, 5, year	Code Quantity: 3, New Code: 2
8	financial, year	Code Quantity: 2, New Code: 1
9	varies, program	Code Quantity: 2, New Code: 1
10	program, cost, calculate	Code Quantity: 3, New Code: 1
11	programme, duration, manpower, cost, planning, stage, completion	Code Quantity: 7, New Code: 0
12	cost, training, calculated, yearly, basis	Code Quantity: 5, New Code: 1
13	one, year	Code Quantity: 2, New Code: 0
14	every, month	Code Quantity: 2, New Code: 0
15	CTC, calculated, every, month, financial	Code Quantity: 5, New Code: 2
16	every, financial, year, cost, training, expenditure, calculated, DISCOM	Code Quantity: 8, New Code: 2
17	Period, time, cost, calculation, estimates	Code Quantity: 5, New Code: 2
18	one, year	Code Quantity: 2, New Code: 0
19	15, 20, years	Code Quantity: 3, New Code: 0

20	every, month	Code Quantity: 2, New Code: 0
21	varies, program	Code Quantity: 2, New Code: 0
22	calculated, yearly, basis	Code Quantity: 3, New Code: 0

Ques 2: What costs are incurred during training programmes?

Respondents	Codes generated	Count
1	direct, cost, training, material, lodging, boarding, conveyance, indirect, staff, salary, electricity	Code Quantity: 11, New Code: 11
2	2, lakhs, per annum, odisha	Code Quantity: 4, New Code: 4
3	1,1.35, lakh, per batch	Code Quantity: 4, New Code: 3
4	1, lakh, per batch	Code Quantity: 3, New Code: 0
5	Travel, Food, Accommodation, Stationary, Venue, Remuneration	Code Quantity: 6, New Code: 6
6	Faculty remuneration, study material, study tour, Boarding, Lodging, man power, programme	Code Quantity: 8, New Code: 3
7	Training Exp	Code Quantity: 1, New Code: 1
8	hospitality, technological advancement	Code Quantity: 2, New Code: 2
9	payments, external faculties, distribution, training, materials, hall, food, tea, stay, arrangements, participants, in-house, program	Code Quantity: 13, New Code: 5
10	stationery, study, material, tool kits, lecture halls, food, honorarium, teaching, aids	Code Quantity: 9, New Code: 5
11	lunch, tea, stationary, water, faculty, remuneration	Code Quantity: 6, New Code: 4
12	cost, incurred, training, programme, resource, tool	Code Quantity: 6, New Code: 4
13	faculty fee, training, food	Code Quantity: 3, New Code: 3
14	1500, employee	Code Quantity: 2, New Code: 2

15	training, equipment, stationary, faculty, fee, cost, loss, productivity, absence, employee	Code Quantity: 11, New Code: 2
16	accommodation, food, course material, faculties, honorarium, travelling, expenses	Code Quantity: 7, New Code: 5
17	reimbursement, expenses, incurred, employee, training	Code Quantity: 5, New Code: 3
18	travel, accommodation, remuneration, stationery	Code Quantity: 4, New Code: 0
19	faculty fee, training, food	Code Quantity: 3, New Code: 0
20	stationery, study, material, tool kits, lecture halls, food, honorarium, teaching, aids	Code Quantity: 9, New Code: 1
21	Travel, Food, Accommodation, Stationary, Venue, Remuneration	Code Quantity: 6, New Code: 0
22	hospitality, technological advancement	Code Quantity: 2, New Code: 0

Ques 3: How can we measure intangible costs?

Respondents	Codes generated	Count
1	intangible, cost, creating, brand name, institute, difficult, measure	Code Quantity: 7, New Code:7
2	not, measured	Code Quantity: 2, New Code: 0
3	depends, type, course	Code Quantity: 3, New Code: 3
4	Depends	Code Quantity: 1, New Code: 0
5	not measured	Code Quantity: 1, New Code: 2
6	apportionment, salary, employees, associated, programme, unkeep, campus, hostel, security, water, power, cost, general, administration, charges	Code Quantity: 15, New Code: 15
7	intangible, cost, not directly, measured, real impact, performance, DISCOMs	Code Quantity: 7, New Code: 4
8	cost, boarding, lodging, air, travel, faculty, refreshment, participants, study, material, hard, soft, copies, photography, tool, kit, C&D, level, training	Code Quantity: 19, New Code: 13

9	difficult, measure, intangible, cost, benefits	Code Quantity: 5, New Code: 0
10	Depends	Code Quantity: 1, New Code: 0
11	intangible cost, creating, brand name, institute, difficult, measure	Code Quantity: 6, New Code: 0
12	intangible cost, directly, impact, performance, DISCOMs	Code Quantity: 5, New Code: 4
13	not measured	Code Quantity: 1, New Code: 1
14	identified, not, qualified	Code Quantity: 3, New Code: 1
15	apportionment, salary, employee, programme, upkeep, campus, hostel, security, water, power, cost, general, administration, changes	Code Quantity: 14, New Code: 14
16	intangible, cost, cannot, quantified, estimate, employee, morale, company	Code Quantity: 8, New Code: 2
17	intangible, cost, identified, qualified, easily, estimated	Code Quantity: 6, New Code: 0
18	Not measured	Code Quantity: 1, New Code: 0
19	identified, not, qualified	Code Quantity: 3, New Code: 0
20	not measured	Code Quantity: 1, New Code: 0
21	intangible cost, creating, brand name, institute, difficult, measure	Code Quantity: 6, New Code: 0
22	difficult, measure, intangible, cost	Code Quantity: 4, New Code: 0

Calculation of benefits of training (CBT)

Ques 1: What are the benefits of Training DISCOMs?

Respondents	Codes generated	Count
1	increase, day, working, efficiency, officers, reduction, transformer, failure, accidents, saving, lives, field, staff, better, customer, care, major, benefits, DISCOMS	Code Quantity: 19, New Code:19
2	Improve, productivity, safety, employees	Code Quantity: 4, New Code: 4

3	Working, skills, improve, use, safety, equipment, cause, decrease, death rate, DISCOM	Code Quantity: 10, New Code: 6
4	employees, required, safety, information, job	Code Quantity: 5, New Code: 3
5	employee, empowerment, increase, performance, better, relationships, smooth, functioning, departments	Code Quantity: 9, New Code: 7
6	safe, operation, proper, maintenance, assets, improve, quality, duration, supply, reduction, losses, knowledge, trends, development, sector	Code Quantity: 16, New Code: 12
7	increased, work, efficiency	Code Quantity: 3, New Code: 0
8	first, benefit, form, mindset, skill, development, personality, knowledge, addition	Code Quantity: 9, New Code: 6
9	learning, correcting, mistakes, past, following, best, practices, adopted, DISCOM, states	Code Quantity: 10, New Code: 9
10	train, improves, customer, relationship, technical, skills, work, quality	Code Quantity: 8, New Code: 7
11	employee, promotion, self esteem, increased, motivated, interest	Code Quantity: 6, New Code: 5
12	rate, accidents, failure, power, damage, machinery, equipment, minimum, well-trained, employees, less, cost, production, generation	Code Quantity: 14, New Code: 12
13	improved, field, performance, reduced, accidents, safety, awareness, staff, technical, upgradation	Code Quantity: 10, New Code: 10
14	increases, efficiency, less accidents, overall, benefits	Code Quantity: 5, New Code: 3
15	improved, organisational, commitment, efficiency, improved, employee, satisfaction, fewer, errors, decrease, safety, violation, revenue, communication, teamwork, customer, satisfaction, reduction, conflicts, stress, productivity	Code Quantity: 21, New Code: 20
16	training, improves, efficiency, employees, educates, methods, current, trends	Code Quantity: 8, New Code: 4
17	capacity, building, clean, energy, portfolios	Code Quantity: 5, New Code: 1
18	Increases, efficiency, benefits	Code Quantity: 3, New Code: 0

19	decrease, safety, violation, revenue, communication, teamwork, customer, satisfaction, reduction, conflicts, stress, productivity	Code Quantity: 12, New Code: 0
20	reduction, losses, knowledge, trends, development, sector	Code Quantity: 6, New Code: 0
21	increases, efficiency, less accidents, overall, benefits	Code Quantity: 5, New Code: 0
22	increase, performance, better, relationships, smooth, functioning, departments	Code Quantity: 7, New Code: 0

Ques 2: What are the intangible benefits of training in DISCOMs in general and for power sector?

Respondents	Codes generated	Count
1	training, latest, knowledge, officer, trained, DISCOMs, long, run, benefits, cannot, measured	Code Quantity: 11, New Code: 11
2	improve, knowledge, productivity, employee, reducing, time, completion	Code Quantity: 7, New Code: 6
3	overall, system, strengthening, skill	Code Quantity: 4, New Code: 4
4	improvement, quality, work	Code Quantity: 3, New Code: 2
5	employee, happiness, balanced, life, positive, mindset, loyalty	Code Quantity: 7, New Code: 6
6	bridging, skill gap, meet challenges, sector, fast, technical, changes, generation, solar, wind, grid, integration, stability, IT, enabled, delivery, system, prepaid, smart, metering	Code Quantity: 20, New Code: 20
7	well, trained, employees	Code Quantity: 3, New Code: 2
8	intangible, benefits, include, change, attitude, thinking, development, positive, aspects, personality	Code Quantity: 10, New Code: 6
9	knowledge, updation, trainee, career, growth, trained, programme, job, quality, work, efficiency, improve, DISCOM, contributes, development, power, sector	Code Quantity: 17, New Code: 15
10	psychological, participant, scope, company, attitude, trained, asset, society, nation, experience	Code Quantity: 10, New Code: 6
11	increase, self, esteem, CRM, interest, work	Code Quantity: 6, New Code: 2
12	training, employees, jobs, efficiency, better, ways, day-to-day, DISCOMs, profitable	Code Quantity: 9, New Code: 4

13	improved, confidence, morale, staff, performance	Code Quantity: 5, New Code: 2
14	increases, efficiency	Code Quantity: 2, New Code: 2
15	improved, organisational, commitment, efficiency, improved, employee, satisfaction, fewer, errors, decrease, safety, violation, revenue, communication, teamwork, customer, satisfaction, reduction, conflicts, stress, productivity	Code Quantity: 21, New Code: 15
16	efficiency, DISCOMs, improved, power, sector, country, growth	Code Quantity: 7, New Code: 4
17	job, effectively, better, tasks, profitable	Code Quantity: 5, New Code: 4
18	efficiency	Code Quantity: 1, New Code: 0
19	overall, system, strengthening, skill	Code Quantity: 4, New Code: 0
20	attitude, trained, asset, society, nation, experience	Code Quantity: 6, New Code: 0
21	training, employees, jobs, efficiency, better, ways, day-to-day, DISCOMs, profitable	Code Quantity: 9, New Code: 0
22	well, trained, employees	Code Quantity: 3, New Code: 0

Ques 3: How can we measure intangible benefits?

Respondents	Codes generated	Count
1	intangible, benefitis, DISCOMs, training, measured, tentatively, calculating, saving, T&D, loss, reduction, transformer, failure, reduction, accidents, financial ,implications	Code Quantity: 17, New Code:17
2	number, safety, incidents, last, year, current, improve, productivity	Code Quantity: 8, New Code: 8
3	yes, consumer, end, employee, manpower	Code Quantity: 5, New Code: 5

4	overall, satisfaction, consumers, employees	Code Quantity: 4, New Code: 2
5	overall, behaviour, staff, happy, environment	Code Quantity: 5, New Code: 4
6	reduction, outage, failure, transformers, improvement, quality, quantity, power, supply, easy, low, cost, delivery, accidents	Code Quantity: 14, New Code: 9
7	identified, quantified	Code Quantity: 2, New Code: 2
8	measured, feeling, chance, overall, behaviour, attitude	Code Quantity: 6, New Code: 3
9	measured, feeling, chance, overall, behaviour, attitude	Code Quantity: 6, New Code: 1
10	difficult, measure	Code Quantity: 2, New Code: 4
11	training, feedback, observe, changes	Code Quantity: 4, New Code: 4
12	growth, revenue, reduction, electrical, accidents, training	Code Quantity: 5, New Code: 3
13	measuring, gains, intangible, tangible, benefits, value	Code Quantity: 6, New Code: 2
14	quantum, consumer, complaints	Code Quantity: 3, New Code: 2
15	identified, quantified	Code Quantity: 2, New Code: 8
16	conducting, training, program, selected, employee, reasonable, improved, performance, calculate, savings, identify, behaviour, attitude, anticipated, amount, trainees	Code Quantity: 16, New Code: 4
17	survey, efficiency, DISCOMs, aggressive, training	Code Quantity: 5, New Code: 5
18	process, elimination, assign, quantitative, intangible, benefits, achieved	Code Quantity: 7, New Code: 0
19	identified, quantified	Code Quantity: 2, New Code: 0
20	difficult, measure	Code Quantity: 2, New Code: 0
21	feedback, observe, changes, training,	Code Quantity: 4, New Code: 1
22	number, safety, incidents, last, year, current, improve, productivity	Code Quantity: 8, New Code: 0

Ques 4: Over what period of time benefit is calculated?

Respondents	Codes generated	Count
1	every, year	Code Quantity: 2, New Code: 2
2	one, year	Code Quantity: 2, New Code: 1
3	time, consuming, process	Code Quantity: 3, New Code: 3
4	15, years	Code Quantity: 2, New Code: 1
5	6, 12, months, training	Code Quantity: 4, New Code: 4
6	over, period 4,5, year, technology, changes, person, undergoes, role, new, training	Code Quantity: 12, New Code: 10
7	4,5, year	Code Quantity: 3, New Code: 0
8	benefit, calculated, over, year, together	Code Quantity: 5, New Code: 3
9	depends, program	Code Quantity: 2, New Code: 2
10	benefits, training, organisation, frequently, implementing, participants, foot basis	Code Quantity: 7, New Code: 3
11	over, period, 4,5, year, technology, changes, new, training	Code Quantity: 9, New Code: 0
12	benefit, training, imparted, employees, calculated short, medium, long, training	Code Quantity: 9, New Code: 8
13	one, year	Code Quantity: 2, New Code: 0
14	Immediately	Code Quantity: 1, New Code: 0
15	benefit, calculated every, month, financial	Code Quantity: 5, New Code: 3
16	period, three, years	Code Quantity: 3, New Code: 2

17	time, benefit, calculated, implemented, employees, DISCOMs	Code Quantity: 6, New Code: 4
18	one, year	Code Quantity: 2, New Code: 0
19	time, consuming, process	Code Quantity: 3, New Code: 0
20	depends, program	Code Quantity: 2, New Code: 0
21	one, year	Code Quantity: 2, New Code: 0
22	5, years	Code Quantity: 2, New Code: 0

Ques 5: What are the short, medium and long term benefits of training?

Respondents	Codes generated	Count
1	day, efficiency, due, training, short, term, benefit, increased, profitability, medium, long, term, benefit	Code Quantity: 13, New Code: 13
2	improve, knowledge, productivity, employee, reducing, time, completion	Code Quantity: 7, New Code: 7
3	short, term, improve, confidence, medium, skill, manpower, long, consumer, satisfaction, truth, DISCOM	Code Quantity: 12, New Code: 9
4	short, term, improvement, working, medium, reduction, fatalities, long, desired, achieved	Code Quantity: 10, New Code: 4
5	short, term, feel, good, increased, performance, better, co-ordination, staff, conflict, management, long, feeling, fulfilment, becoming, leader, influencing, both, workplace, outside	Code Quantity: 20, New Code: 16
6	short, term, immediate, improvement, working, areas, knowledge, colleagues, improve, organization, benefit, skill, obtained, useful, employees, experience	Code Quantity: 16, New Code: 4

7	increased, work, efficiency	Code Quantity: 3, New Code: 0
8	short, benefits, include, knowledge, addition, medium, change, behaviour, long, making, public, relations, better, winning, hearts	Code Quantity: 15, New Code: 6
9	knowledge, updation, learning, new, things, relearning, unlearning, trained, personnel, performance, improve	Code Quantity: 11, New Code: 5
10	short, medium, long, term, benefits	Code Quantity: 5, New Code: 0
11	short, term, immediate, improvement, working, areas, knowledge, colleagues, improve, organization, benefit, skill, obtained, useful, employees, experience	Code Quantity: 16, New Code: 0
12	short, term, training, expand, knowledge, disrupting, training, produce, upskilled, employee	Code Quantity: 10, New Code: 8
13	quality, improvement, conference, safety, awareness	Code Quantity: 5, New Code: 5
14	efficiency, morals, increased, growth	Code Quantity: 4, New Code: 2
15	improved, organisational, commitment, efficiency, improved, employee, satisfaction, fewer, errors, decrease, safety, violation, revenue, communication, teamwork, customer, satisfaction, reduction, conflicts, stress, productivity	Code Quantity: 21, New Code: 15
16	short, term, benefit, need, training, improves, technical, development, medium, attitude, morale, changes, management, long, financial, improvements, consumer, satisfaction	Code Quantity: 18, New Code: 10
17	basis, data, information, training	Code Quantity: 4, New Code: 2
18	Improved, knowledge, skill, reduced, outages	Code Quantity: 5, New Code: 0
19	improve, knowledge, productivity, employee, reducing, time, completion	Code Quantity: 7, New Code: 0
20	short, term, improve, confidence, medium, skill, manpower, long, consumer, satisfaction, truth, DISCOM	Code Quantity: 12, New Code: 0

21	short, term, improvement, working, medium, reduction, fatalities, long, desired, achieved	Code Quantity: 10, New Code: 0
22	short, term, feel, good, increased, performance, better, co-ordination, staff, conflict, management, long, feeling, fulfilment, becoming, leader, influencing, both, workplace, outside	Code Quantity: 20, New Code: 0

Ques 6: According to you what benefits can training framework bring in for rural electrification?

Respondents	Codes generated	Count
1	training, officers, DISCOMs, villages, electrification, works, faster, rural, India, DISCOMs, manage, situation, better, natural, calamities, cyclone	Code Quantity: 16, New Code: 16
2	improve, knowledge, productivity, employee, reducing, time, completion	Code Quantity: 7, New Code: 7
3	full, utilization, govt. scheme, provide, satisfactory, SAIFI, SAIDI, reports	Code Quantity: 8, New Code: 8
4	reduction, losses	Code Quantity: 2, New Code: 2
5	better, service, more, faster, productivity	Code Quantity: 5, New Code: 4
6	last, mile, connectivity, value, chain, important, link, distribution, rural, areas, neglected, quality, quantity, improved, revenue, DISCOM, pave, way, increase, small, scale, MSME, industries, utility, consumer, state, benefit	Code Quantity: 27, New Code: 20
7	well, trained, employee, perform, work, safely	Code Quantity: 6, New Code: 6
8	Increase, reputation, Organisation, funds, poured, govt.	Code Quantity: 6, New Code: 5
9	rural, working, staffs, trained, short, period, change	Code Quantity: 7, New Code: 2
10	50, practical, theory, participants, benefits, particularly, education, system, designed, practical, methodology, advisable, culture, workmen	Code Quantity: 14, New Code: 12
11	trainees, villages, jurisdiction, unelectrified, work, efficiently, electrify	Code Quantity: 7, New Code: 7

12	benefits, training, increased, efficiency, quality, power, less, outages	Code Quantity: 8, New Code: 6
13	reduces, accidents, safety, awareness, improvement, quality, service	Code Quantity: 7, New Code: 4
14	Change	Code Quantity: 1, New Code: 1
15	improved, organizational, commitment, efficiency, improved, employee, satisfaction, fewer, errors, decrease, safety, violation, revenue, communication, teamwork, customer, satisfaction, reduction, conflicts, stress, productivity	Code Quantity: 21, New Code: 14
16	rural, working, staffs, trained, short, period	Code Quantity: 6, New Code: 4
17	first, survey, estimates, electrification, rural, areas	Code Quantity: 6, New Code: 2
18	Change	Code Quantity: 1, New Code: 1
19	reduction, losses	Code Quantity: 2, New Code: 0
20	better, service, more, faster, productivity	Code Quantity: 5, New Code: 0
21	benefits, training, increased, efficiency, quality, power, less, outages	Code Quantity: 8, New Code: 0
22	well, trained, employee, perform, work, safely	Code Quantity: 6, New Code: 0

ROI Methodology (RM)

Ques 1: What are the important measures of return on investment of Training?

Respondents	Codes generated	Count
1	input, cost, power, interest, borrowed, funds	Code Quantity: 6, New Code: 6
2	analysis, pre, post, training, improvement, employees	Code Quantity: 6, New Code: 6

3	overall, improvement, employee, DISCOMs	Code Quantity: 4, New Code: 2
4	maximum, employees, get, trained	Code Quantity: 4, New Code: 2
5	more, satisfied, customers, more, profits, saving, wastage, electricity, unnecessary, costs	Code Quantity: 10, New Code: 10
6	cost, involved, training, employees, utility, whole, benefits, derived, corporation, compared, pre, post, training	Code Quantity: 13, New Code: 8
7	quality, training, rural, electrification, investment, DISCOMs	Code Quantity: 6, New Code: 0
8	important, measures, return, include, development, more skilled, manpower, knowledge, addition, development, good, work, culture, organization	Code Quantity: 15, New Code: 12
9	fees, major, source, making, training, program, free, cost, indirectly, help, business	Code Quantity: 11, New Code: 9
10	training, investment, trained, asset, organization, nation, self, add, skill, oriented, program	Code Quantity: 11, New Code: 4
11	employees, promotion	Code Quantity: 2, New Code: 0
12	training, require, time, money, resources, measures, return, investment, annual, revenue, quality, power	Code Quantity: 12, New Code: 7
13	reduction, accident, improvement, revenue, reduction, administrative, cost	Code Quantity: 7, New Code: 2
14	benefits, cost, training	Code Quantity: 3, New Code: 0
15	identifying, training, organisation, benefit, cost	Code Quantity: 5, New Code: 1
16	repeated, training, measure	Code Quantity: 3, New Code: 1
17	trainees, actively, participated, apply, workplace	Code Quantity: 5, New Code: 2
18	quality, training, rural, electrification, investment, DISCOMs	Code Quantity: 6, New Code: 0
19	maximum, employees, get, trained	Code Quantity: 4, New Code: 0

20	fees, major, source, making, training, program, free, cost, indirectly, help, business	Code Quantity: 11, New Code: 0
21	input, cost, power, interest, borrowed, funds	Code Quantity: 6, New Code: 0
22	overall, improvement, employee, DISCOMs	Code Quantity: 4, New Code: 0

Ques 2: How ROI methodology is useful for training Investment of DISCOMs for Rural Electrification

Respondents	Codes generated	Count
1	calculable, benefits, training, particular, period, divided, amount, spent, period, training, ROI, training	Code Quantity: 12, New Code: 12
2	analysis, improve, training, methodology, framework	Code Quantity: 5, New Code: 4
3	reduction, losses	Code Quantity: 2, New Code: 2
4	reduction, AT&C losses	Code Quantity: 2, New Code: 0
5	revenue, realization	Code Quantity: 2, New Code: 2
6	presently, no, significant, methodology, adopted	Code Quantity: 5, New Code: 2
7	NA	Code Quantity: 0, New Code: 0
8	quality, training, provided, rural, electrification, obviously, more, investment, DISCOMs, rural, electrification	Code Quantity: 11, New Code: 6
9	improvement, quality, service	Code Quantity: 3, New Code: 1
10	reduction, losses	Code Quantity: 2, New Code: 0
11	calculable, benefits, training, particular, period, divided, amount, ROI	Code Quantity: 8, New Code: 4

12	ROI, methodology, investment, divided, annual, savings, expressed, gaining, knowledge, skills, increase, efficiency, reduce, costs, workplace	Code Quantity: 15, New Code: 9
13	improvement, quality, service	Code Quantity: 3, New Code: 2
14	revenue, realisation	Code Quantity: 2, New Code: 2
15	ROI, methodology, justify, expense, training, program	Code Quantity: 6, New Code: 5
16	ROI, methodology, invest, training	Code Quantity: 4, New Code: 0
17	return, investment, rural, electrification, achievement	Code Quantity: 5, New Code: 2
18	revenue, realisation	Code Quantity: 2, New Code: 0
19	calculable, benefits, training, particular, period, divided, amount, spent, period, training, ROI, training	Code Quantity: 12, New Code: 1
20	reduction, AT&C losses	Code Quantity: 2, New Code: 0
21	reduction, losses	Code Quantity: 2, New Code: 0
22	revenue, realization	Code Quantity: 2, New Code: 0

Effectiveness of training (ET)

Ques 1: What factors impact on the results of ROI?

Respondents	Codes generated	Count
1	All, cost, components, relating, training, effects, ROI	Code Quantity: 7, New Code:7
2	NA	Code Quantity: 0, New Code: 0
3	collection, analysation, key, factor	Code Quantity: 4, New Code: 4
4	monetary, data, analysed	Code Quantity: 3, New Code: 2

5	training, fees, conducting, training, program	Code Quantity: 5, New Code: 4
6	benefits, training, accrue, over, period, time	Code Quantity: 6, New Code: 6
7	employee, turnover	Code Quantity: 2, New Code: 2
8	skilled, faculty, greater, investment, participants, better, quality, training, impact, ROI	Code Quantity: 10, New Code: 6
9	training, fees, received, cost, conducting, training, programs	Code Quantity: 7, New Code: 4
10	monetary, data, analyzed	Code Quantity: 3, New Code: 0
11	All, cost, components, relating, training, effects, ROI	Code Quantity: 7, New Code: 0
12	trainees, knowledge, skills, increase, efficiency, workplace, measuring, cost, training, benefits, individuals, organization	Code Quantity: 12, New Code: 6
13	improvement, performance, technical, upgradation	Code Quantity: 4, New Code: 2
14	market, power, better, access, talent	Code Quantity: 5, New Code: 5
15	training, benefits, cost	Code Quantity: 3, New Code: 0
16	analyze, field, results, ROI	Code Quantity: 4, New Code: 0
17	benefits, training, accrue, over, period, time	Code Quantity: 6, New Code: 0
18	training, fees, conducting, training, program	Code Quantity: 5, New Code: 0
19	cost, components, relating, training, effects, ROI	Code Quantity: 6, New Code: 0
20	benefits, training, accrue, over, period, time	Code Quantity: 6, New Code: 0
21	collection, analyzation, key, factor	Code Quantity: 4, New Code: 0
22	cost, components, relating, training, effects, ROI	Code Quantity: 6, New Code: 0

Ques 2: How to isolate the effect of training?

Respondents	Codes generated	Count
1	very, difficult, isolate	Code Quantity: 3, New Code: 3
2		Code Quantity: 0, New Code: 0
3	control, groups, arguably, most, accurate, isolate, impact, training, comparison, between, performance, received, training	Code Quantity: 13, New Code: 12
4	KPI, points, considered	Code Quantity: 3, New Code: 3
5	training, institute, DISCOMs	Code Quantity: 3, New Code: 2
6	tried, training, one, segment, cluster, compare, other, circle, same	Code Quantity: 9, New Code: 8
7	isolating, effect, very, difficult	Code Quantity: 4, New Code: 1
8	making, training, industries, DISCOMs	Code Quantity: 4, New Code: 2
9	effect, training, cannot, isolated	Code Quantity: 4, New Code: 0
10	points, considered	Code Quantity: 2, New Code: 0
11	very, difficult, isolate	Code Quantity: 3, New Code: 0
12	department, money, present, evidence, positive, effect, desired, goals, respective	Code Quantity: 9, New Code: 6
13	refreshment, course, included	Code Quantity: 3, New Code: 2
14	visualize, efficiency, morals	Code Quantity: 3, New Code: 2
15	comparing, performance, employee, training, impact, business, before, after	Code Quantity: 8, New Code: 4
16	group, discussion	Code Quantity: 2, New Code: 1

17	tried, training, one, segment, cluster, compare, other, circle, same	Code Quantity: 9, New Code: 0
18	training, segment, cluster, compare, other, circle, same	Code Quantity: 7, New Code: 0
19	difficult, isolate	Code Quantity: 2, New Code: 0
20	training, institute, DISCOMs	Code Quantity: 3, New Code: 0
21	impact, business, before, after, training	Code Quantity: 5, New Code: 0
22	isolating, effect, very, difficult	Code Quantity: 4, New Code: 0

Categorisation:

13 Initial Category and 11 Refined Category

Initial category	Refined Category
Cost of benefit is calculated yearly or as per requirement	Time period to calculate cost of benefit as per requirement
Cost incurred during program include online expenses mostly due to covid-19, this includes: online prgrams, internet charges, cost of online platform,etc. Whereas pre covid cost includes: faculty honourarium, training material, Stationary, Refreshments, etc.	Cost of training during program pre and post covid measured
Intangible costs can be measured by means of survey, Key performance indicators, Feedbacks and market survey	Means to measure intangible cost incurred during training
Benefits of training in DISCOMs include: Cash flow from end consumers helps DISCOMs function efficiently and sustain power sector, referesh the knowledge, improves confidence, removes deadlocks, etc	Benefits of training in DISCOMs in general and in power sector
Intangible benefits of DISCOMs in general include: service quality, morale, enhanced efficiency, team building, whereas intangible benefits of DISCOMs in power sector includes: uninterrupted power supply by optimum utilization, energy saved and produces, customer satisfaction and fewer complaints/grievances.	Benefits of training in DISCOMs in general and in power sector
Intangible costs are measured by understanding various aspects and linkages of power system, by measuring KPIs, by equipment failures, carrying out surveys and feedbacks, etc	Intangible costs measured by various aspects
Benefit of training can be calculated quarterly, bi-annually or yearly	Time period to calculate cost of benefit as per requirement
Short term benefits of training are knowledge imparted to employees, team building. Medium term benefits include skill development, efficiency improvement and knowledge upgradation. Long term benefits include: improvement in overall performance of DISCOMs, improvement of employee productivity, reputation and building of brand image	Benefits of training measured in different period of timespan
Benefits of training in rural electrification is to cater low density population, gets lower priority in attendance of electricity faults, elevated level of knowledge, skill and attitude of employees, expansion of team, etc	Benefits of training in rural electrification
Crucial measures of ROI of training include: KPIs, higher productivity levels, higher ratings of consumer feedback, etc	Important measures of ROI of training
Importance of ROI methodology for training investment for rural electrification by measuring both tangible and intangible benefits of training vs training investment, it is important for employees to be upgraded to latest technologies, work procedures to improve efficiency levels inorder to meet deadlines and targets	Important measures of ROI of training
Factors that alter ROI result include type of equipment on which training is to be provided , basic knowledge level, method of measurement and its accuracy, time, technology, etc	Factors that affect ROI result
To isolate the effects of training post and pre training data is important and perceptions of individual & their superiors can help, also same parameter should be used to measure two different variables, providing necessary support systems, competent approvals, sufficient time, etc are the isolated training effects	To isolate the effects of training post and pre training data is important
13	11

A3.3 INTERVIEW PROTOCOL RESPONSE CODE & SATURATION

Ques	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15	R16	R17	R18	R19	R20	R21	R22
1	5	1	2	0	0	8	2	1	1	1	0	1	0	0	2	2	2	0	0	0	0	0
2	11	4	3	0	6	3	1	2	5	5	4	4	3	2	2	5	3	0	0	0	0	0
3	7	0	3	0	2	15	4	13	0	0	0	4	1	1	14	2	0	0	0	0	0	0
4	19	4	6	3	7	12	0	6	9	7	5	12	10	3	20	4	1	0	0	0	0	0
5	11	6	4	2	6	20	2	6	15	6	2	4	2	2	15	4	4	0	0	0	0	0
6	17	8	5	2	4	9	2	3	1	4	4	3	2	2	8	4	5	0	0	0	0	0
7	2	1	3	1	4	10	0	3	2	3	0	8	0	0	3	2	4	0	0	0	0	0
8	13	7	9	4	16	4	0	6	5	0	0	8	5	2	15	10	2	0	0	0	0	0
9	16	7	8	2	4	20	6	5	2	12	7	6	4	1	14	4	2	1	0	0	0	0
10	6	6	2	2	10	8	0	12	9	4	0	7	2	0	1	1	2	0	0	0	0	0
11	12	4	2	0	2	2	0	6	1	0	4	9	2	2	5	0	2	0	1	0	0	0
12	7	0	4	2	4	6	2	6	4	0	0	6	2	5	0	0	0	0	0	0	0	0
13	3	0	12	3	2	8	1	2	0	0	0	6	2	2	4	1	0	0	0	0	0	0

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- Exposure to Project Finance activities

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- Master the fundamentals of Artificial Intelligence from BSE Institute Ltd
- Certificate Course (Three Months) in Insolvency and Bankruptcy Laws and Procedure from Indian Institute of Corporate Affairs
- Training of Trainers (TOT)- Rooftop Solar for Utility Grid Engineers by MNRE-NISE-USAID PACED

- Certified Energy Auditor by Bureau of Energy Efficiency (BEE), Govt of India
- Energy Auditor from JICA (Japan International Cooperation Agency)
- Certified Level D for Project Management by IPMA International Project Management Association (IPMA), Netherlands

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N.I.T. Durgapur, India	B.E(Mechanical Engineering)	75.8%

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