CHAPTER-6

CONCLUSIONS AND RECOMMENDATIONS

6.1 CONCLUSION:

The research study was carried out beginning with literature study focused on policies in Indian power sector along with the study of the recommendations of Shunglu Committee and B. K. Chaturvedi Committee on franchisee and PPP model respectively. Detailed study of Global Power sector reforms focused on Open, Mixed and Controlled economies was done for comparative analysis and their inputs were appropriately used for recommending Strategies for Indian Power Sector. Comparative study of different distribution models in India and their viability based on important parameters is also discussed. The quantitative analysis was done in two stages for critical analysis of the Power Utility business based on responses received. Important factors influencing the Utility Business were derived in Quantitative analysis stage-1 along with Utility wise comparison and selection of best model for further study in Stage 2. Quantitative analysis-2 highlights uniform understanding and sustainability approach of TPDDL, a PPP model Utility through use of SWOT &IE analysis tools. The detailed future strategy for the preferable business model in Power Utility business is corroborated through various business prepositions in core and Non-core areas.

In stage -1 Quantitative analysis-1was done for the responses received from respondents representing SEB, PPP and Franchisee model Utility through

factors influencing the sustainability of the business were derived.

- Technology adoption
- Asset Optimization
- Capacity building

- Business Prospects
- Customer Satisfaction
- Power Reforms
- Competitiveness
- Employee contentment
- Political Preposition
- Corporate Social Strategy.

As the factor derived were significant through Kruskal Wallis test and to identify the Utility with better performance considering the above factors, Mean and Median test were performed. Based on the Mean and Median value PPP model Utility was selected to develop Business sustenance strategy.

In stage 2, Quantitative analysis through SPSS is done for the PPP model Utility (TPDDL) respondents to derive key Internal and external factors influencing the Utility. Following are the factors derived out of the analysis.

- Customer Satisfaction
- Business opportunity
- Policy on Renewables
- Regulatory Environment
- Expertise in Distribution and Brand value
- Strong Business Processes
- Technology Leader
- Social participation
- Employee Engagement

On considering the above factors, SWOT analysis of PPP Model (TPDDL) utility was done to derive business preposition in core and Non-core area through IE analysis.

Business diversification in Core and Non-core not only enhance the business sustenance and profitability of the Organization but also it benefits the consumers and Employees. The Additional revenue from the Non-Core area Business is passed on to the consumers in terms of tariff reduction. **(Refer**

Appendix-E, Guidelines of Regulator commission). The employees of the organization are benefitted through opportunities for working in different areas and development of new skill sets. The success journey in terms of operation performance and financial results corroborates above results and associated strategies recommended for Power distribution business. IE analysis carried out for various business prepositions indicates guideline for different utilities based on their SWOT prepositions for selection of businesses in Core and Non-Core areas as part of business diversification. This research also indicates the success story of the utilities through social participation and various Corporate Social Responsibility initiatives. This research also helps us to curtail the financial burden on account of peak load management through voltage optimization initiatives adopted by TPDDL. This research can be extended with additional studies to recommend a focused strategies for different distribution models working as Government Electricity Board and Distribution Franchisee which are operating in completely different environment.

Literature review focused on Power distribution in India and Global Power sector reforms along with business sustainability model of other industries reveals that sustainability can be achieved through following.

1. Integration of Utility- Power, Water and Gas Utilities
2. Focus on Renewables- Supply and Demand side Management
3. Social Participation- CSR initiatives by utility to have a win-win solution.

Business strategy for Indian Power distribution companies can be developed based on following broad strategies.

1. Exploration strategy
2. Exploitation strategy

Key business prepositions for Business sustenance of Power Utilities can be derived based on IE and SWOT analysis and propose organizational road map.

Exploration Strategy- Selection of the business for diversification based on opportunities in market and strength of the organization.

- Roof Top solar- To bridge the supply and demand gap of Electricity
- Electric vehicles- Complementing existing infrastructure
- U-telco-Harnessing Asset base for other value added services

Exploitation strategy

- Open access- Capitalizing on organization strength.
- Asset Sweating through advertisement

6.2 RESEARCH GAP FULFILMENT

Exhaustive research works considering various themes relating to business sustainability of Power distribution Utility in India have not been done by any of the researchers. The issues which are reported in various government/private reports have not been empirically tested by the researchers in the past. Through this research the global power sector reforms were studied along with the Indian context to identify the sustainable business strategy. The Factors affecting sustainability of SEB, PPP and Franchisee models utility in India were reviewed through various literature and validated through factor analysis. As in the past no researcher has attempted to identify the various issues related to Business Sustainability of Power distribution utility this exhaustive research study helped to identify business sustainability strategies by diversification of Business in core and Non-core areas. Issues of Power Utility. TPDDL was exhaustively studied from various factors' point of view and how they are following different Business Sustainability strategies.

6.3 CONCLUSIONS WITH THEORITICAL CONSTRUCTS

The objectives of the study have been satisfied through the results of the study that has been discussed below.

Progress of nation is difficult without sustainable growth and development of power sector and measures needs to be taken to improve the performance of power sector. Diversification of energy resources has been considered critically important for sustainable supply of electricity for future generation of the country. Greater emphasis is placed on alternative sources of energy for

sustainable supply of electricity for longer period (Cerovi & Maradin, 2014; Okoro and Chikun, 2007). Some of the prominent renewable sources of energy include Hydro / Nuclear / Renewable energy, Thermal energy, Biogas & Fossil fuels, Supercritical technology etc. The same paper identified the need for introducing power reforms and integrating technological up gradation for improving market efficiency (Cerovi & Maradin; Xuegong, Liyan, & Zheng, 2012; Markets, Deloitte Touche Tomatsu Emerging Markets, Ltd 2004; Remme, Trudeau, Graczyk, & Taylor, 2011; CEA Report 2010). Though reforms were not able to suppress the demand, but were able to address issues relating to power thefts and technical losses (Wamukonya, 2003). Competitive market is must for reforms to achieve its objectives (Ranjan Das, 2010; Satapathy, Patel, Mahapatra, Beriha, & Biswas, 2011). Power sector reforms of China were divided into three stages namely transmission, distribution and independent retailers to allow users to select appropriate supplier of electricity of their choice. China felt the need to implement a centralized, unified regulatory system for proper electrification of their country and reduction of regional imbalances (Xu, & Chen, 2006). Power sector for different developed and developing economies were analyzed in detail to find suitable strategy for India or discover suitable amendments to be incorporated in current reform structure of India (Gautam S. Dutt et al, 1999; Young-Hwan Moon, 2004; Jaime Milan, 2001; Nazif Hulagu Sohtaoglu et al., 1999).

Many factors have been observed that point towards the evolution of power sector. Similar to the results of our study, (Dash, 2007) considered factors like employee participation, accountability, transparency, law and order, political preposition, quality of regulation etc. to be important for initiating reforms in power sector. Governance plays a critical role in determining the performance of distribution sector. All social, financial, infrastructure, private and public sectors are active in areas affecting the governance of the power sector (Markets, Deloitte Touche Tomatsu Emerging Markets, Ltd 2004). The study highlighted key policy interventions like (Participation, Privatization, Restructuring, Separation, and Corporatization) that are indispensable to maintain the efficiency and quality of service provided (Young-Hwan Moon-

IEEE, 2004; Khaparde, IEEE, 2009; Satapathy, Patel, Mahapatra, Beriha, & Biswas, 2011). The underlying principle for Privatization reforms was to decrease AT&C losses of the DISCOMs which further helps in increasing profits generated by the company (Bacon, & Besant-Jones, 2001). PWC (2015) proposed certain amendments that are crucial for enhancing functioning of power sector. These amendments not only aim to promote the use of renewable source of energy but also intend to separate the carriage from content power distribution function. S K Mittal, (2007) investigated the need and importance of an efficient short term power market to encourage the competition in the market to reduce the demand and supply gap mismatch through DSM. It can be seen that state wise performance varies on account of capability of the power sector to reduce commercial losses, management of overall load composition and tariff rationalization.

Furthermore, factor analysis has shown that customer satisfaction, employee satisfaction and employee engagement are important parameters to evaluate business strategy adopted by Indian electricity sector (Khurana & Banerjee, 2014; Kumar et al, 2011; Satapathy, Patel, Mahapatra, Beriha, & Biswas, 2011). Sathpathy et al (2012) studied perception of customers belonging to different sectors (domestic, agricultural, commercial and industrial) towards the quality of service provided by electricity utility industry. They explained the perception of customers on the basis of constructs like reliability, tangibility, empathy, assurance, empathy, responsiveness, security and stability. Kundu & Mishra (2011) in his discussion recognized variables that impact consumers of electricity to study the effect of reforms and privatization on consumers. A.R. Sihag, Neha Mishra, Vivek Sharma (2004) raised out the point that human element is missing in the reforms implemented in India, restricting delivery of services provided to poor people constituting the large population of the country. Dubrovsky and Maurer (2001) studied elements of employee attitude and resistance and Joskow (2000) stressed upon the fact that transmission of both financial and physical rights can enhance can enhance electricity seller or buyer market power. Okoro and Chikuni(2007) proposes certain suggestions like privatization, centrally controlled distribution function, pre-paid metering, encouraging private investors to control the

overall functioning of power sector while restricting the government role to take care of investment opportunities, to help electricity sector cover the demand and supply gap in Nigeria. Alam, Kabir, Rahman & Chowdhury (2004) places greater emphasis on observing distribution system to maintain system losses and overwhelm the malpractices of personnel leading to increased revenue and loss reduction.

Different sustainable strategies based on cross national and national models were studied to help developing countries optimizing their load capacity and profitability. Glen Weisbrod (1998) discussed the significance of DSM in power purchase cost optimization for Power utility, energy Service Company, investment and profit sharing model, scope in India. The study conducted by Karekezi and Kimani (2002) and Dussan (1996) emphasizes on the fact that there is no exclusive solution for crafting power sector reform in one particular country. Nilesh Kane and Dr. Tarun Dhingra (2013) emphasize on social participation and CSR initiatives for operation enhancement, customer satisfaction and loss reduction through consistent billing and revenue collection. Rather regulatory framework of different countries and their political situation and policies anticipate reforms to be implemented. Lack of political and administrative support restricts FDI in power sector, in spite of the fact that 100% foreign equity is legalized in generation, transmission, and distribution (Financial Express, 2016; Kanakasabapathy & Shanti Swarup, 2009). Nilesh Kane and Dr. Tarun Dhingra (2013) highlight the technology adoption to meet peak load management through voltage optimization techniques. The inability to amplify generation capacity of the country is the reason behind accumulating financial losses of the sector. Augmented financial assistance from potential investors is prerequisite for meeting the increasing demand for energy (Bhattacharya and Patel, 2007; Markets, Deloitte Touche Tomatsu Emerging Markets, Ltd 2004; Blackman and Wu, 1998; Meyers et al, 1993). In order to address issues corresponding to costs and financial position of distribution utilities in India, Harmsen, Moth & Kumar (2014) conducted the study and recommended solutions which are appropriate for a utility based energy saving obligation scheme within India. Analysis stated that proposal of mandatory DSM scheme for India will not

result in instinctively result in electricity savings. Several papers focused on the paradigm shift in power sector after commencement of Electricity Act 2003. The majority of them investigated measures and schemes to reduce transmission cost and improve efficiency of the distribution sector (Moskovitz, 2007; Sihag, Misra and Sharma (2004); Bouille, Dubrovsky and Maurer, 2001; Meyers et al, 1993). Yadav, Padhy, & Gupta, (2010) pointed out that overall performance of Electricity Distribution Utility is an outcome of its overall efficiency. The distribution company should be a technology leader in its area of operation. This result is verified by the study conducted by Gupta & Srivastava (2004) that also discussed the need of implementing power distribution automation system for improving performance.

Therefore, after the commencement of Electricity Act 2003, much of emphasis was placed on development of power sector to help it overcome financial losses. An analysis of such kind help in discovering factors influencing power utility business and performance of the same. A scrutiny of the results obtained through detailed analysis represents strategies that play an important role in sustainable growth and development of distribution business.

6.4 RECOMMENDATIONS:

Recommendations were provided to help PPP model Utility (TPDDL) to formulate strategies to overcome AT&C losses. Quantitative analysis, with help of IFE matrix helps in recommending suitable strategies for the firm to adopt and expand its business in core and non-core areas. Research study and its results overviews a strategy plan for business sustainability through diversification of its operation in core and non-core areas with best utilization of strength and opportunities in the power sector. It also emphasizes a tentative roadmap for selected businesses in next five years for a utility operating in PPP Model. The research also emphasizes on social participation and technological initiatives like peak load management through voltage optimization for business sustenance. Detailed study of two utilities, namely, TPDDL and MSEDCL, were done on initiatives taken on social participation and CSR. The results were encouraging that it improves the utility

performance in terms of reliability, customer satisfaction and loss reduction through input billing rate and revenue collection.

6.5 RESEARCH CONTRIBUTIONS

The current study was able to address the issues affecting power distribution business in India. The study was able to recommend optimal solutions for PPP model utility (TPDDL) to overcome AT&C losses and to develop sustainable strategies for fulfilling the electricity needs of forthcoming generation. Study draws attention of power sector in identifying renewable sources of electricity and realizing it to its full potential. The study was able to propose demand fulfilling viable solutions. Power sector should focus on utility performance with simultaneous focus on Cost reduction and Revenue Generation. Cross-border strategies were studied and comparative analysis of such kind helps in delivering optimal solutions to overcome the shortcomings in current distribution business. Detailed studies were carried out on all the distribution models currently prevailing in India and observed that PPP model was more successful. Unfortunately, since 2002, PPP model is operated only in 3 utilities operating in Delhi. Hence we recommend to implement the PPP model in other distribution utilities for business sustenance.

6.6 LIMITATION OF STUDY

- This study is focused to Power Utility Companies in India only and detailed analysis is done for PPP Model
- This study is limited to Business sustainability and detailed financial analysis is not done.
- Global reforms references were used based on literature review but detailed analysis based on Data Collection Protocol and interviews not done.
- Integration of Renewable: In order to reduce the power purchase cost, Renewable generation needs to integrate.

  Government had mandated RPO for all the distribution utility for using certain percentage of the total consumption through renewable.

- Open access: Carriage and content: Competitiveness creation by provision of Open access to consumers above 1MW load needs to be relooked for smaller consumers.
- SMART Meter Technology adoption for Theft reduction and Demand Management.
- Effective Regulatory Mechanism and Government guidelines for Power quota allocation for Optimization of Power Purchase Cost(**Ref. Appendix-D)**

6.7 FUTURE SCOPE OF STUDY

Suggestions

- Further studies can explore to compare diversification success stories of other industries and their inputs for power sector utilities.
- Further studies can develop separate study of Quantitative and qualitative analysis for other models like Franchisee and Government utility to have in-depth studies and recommendations
- Quantitative analysis of power sector reforms and results can be done for Global utilities
- Further studies can test the Sustainability propositions for state Generation and transmission utilities in India.

6.8 CONCLUSIONS

This chapter provides the summary of this research which would help in fulfilling the gaps identified in literature review through the conclusions derived from the findings and researcher's recommendations for future researches dealing with similar concern areas. This section also highlights some problem areas for which the study was not able to find optimal solutions. Quantitative analysis helped in recognizing factors affecting sustainability of power distribution models. The exhaustive analysis of PPP model Utility (TPDDL) from innumerable factor's point of view assisted assimilating sustainable areas of development for the power sector. This research urges on

the emerging need for restructuring the business on the basis of exploration and exploitation strategy for the business sustenance of power distribution utility in India.