

Analysis of Service Quality of Power Utilities

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Abstract – Service quality is one of the pivotal concerns for any service industry whether it is banking, hotels, shopping malls or electricity distribution utilities. This work dwells into the domain of service quality of electricity distribution utilities. Various notable studies have been undertaken for measurement and analysis of quality of the services which the utility offers to its consumers. This study brings various significant works based on service quality models like SERVQUAL to the fore along with their pros and cons. Different case studies of different areas in the world have been reviewed here. Among many models available for service quality analysis, SERVQUAL model have been focused upon in this paper. Many research papers have utilized the gap between customer perceptions and expectations towards different attributes of company's services as the indicator of service quality. Beside the study of state-of-the-art of the service quality analysis in power utilities, various strategies which should be taken care by the electricity utilities for upgrading their level of service quality have also been briefed in this study.

Keywords – Service quality, power sector, SERVQUAL.

I. INTRODUCTION

Today, service industry has reached to every nook and corner of the world. Its prominence can be judged by the fact that no economy can flourish without the service industry whether it is electricity utility, transportation, health care or education. The industrial world has witnessed the major turn from the manufacturing to service sector. With this turn, attention towards service quality has increased drastically in all the service industries. For the efficiency analysis of any service industry, level of service quality has become a significant parameter. Service quality is as important as other factors like price and cost etc. Now, customers have started demanding the better service quality in all the spheres [32]. Higher demand of better service quality has been supported by the presence of many companies in the same service industry leading to the competition in the market. Choice with the customer to choose the company freely on their own has pushed all the companies to upgrade its service quality. Enhancement of their services and emphasis on its desirability has become a major challenge for the service utilities as these inefficient services indirectly lead to their financial losses [18, 27-30].

Like any other kind of service utilities, electricity service industry has also witnessed many ups and downs. During post-independence era, the electricity sector was completely in hands of state electricity boards. Due to sluggish and obsolete management, none heeded towards the service quality. Indian electricity sector was known due to its poor service quality. Later, the reform measures in the electricity sector have brought the private players in the field with open access to the market [23, 36]. This infused the competition

in the market which was earlier driven by monopoly organizations. Privatization of the companies led to the constant efforts toward improving service quality.

Service quality is judged from the concepts of customer expectations and customer perceptions. Poor performance of utilities has been causing the gap between customer expectations and customer perceptions [32-35, 37, 38]. This gap increases with the poor service quality. Consequently, customer satisfaction gets adversely affected which creates hindrances in the overall development of the utility. Service quality needs to be up scaled to have better perceptions of customers toward the functioning of utility. Better service quality for the electricity utilities are defined in terms of proper supply of electricity, less frequency of interruptions, small duration of interruptions, quality of electricity supply etc [26, 39-49]. Earlier electricity consumers didn't have choice but they can now choose their supplier which provides better services. In this way, service quality has become one of the primary concerns for the service industries.

II. LITERATURE REVIEW

Research in service quality gained momentum since it was first analyzed in 1980s. There are many great personalities which have contributed to the study of service quality since its emergence. To name a few, Cronin & Taylor, Gronroos, Parasuraman, Zeithmal & Berry and Rust & Oliver and many others. Numerous models have been proposed for the quantitative and qualitative analysis of the service quality. Some of the mostly employed models are SERVQUAL and SERVPERF to measure the level of service quality. Though

there are many models available for empirical studies, but it is always recommended that the service quality model should be customized as per the industry norms as every utility has its different operational management. Many researchers have analyzed the importance of service quality for the progress of a service industry and the measurement of level of service quality in terms of different parameters like empathy, reliability, tangibility, assurance, communication, responsiveness, security, credibility etc. Some of the significant works have been below briefed and also presented in Table 1.

Chakravorty Ujjayant et al. have investigated the impact of service quality on the household income of consumers [5]. Extent of electrification and the quality of electricity supplied are the two parameters of service quality that has been analyzed. They have worked upon datasets of more than 10,000 households to get the finding that the non-agricultural incomes of rural households get raised by around 9% due to grid connection. Both good quality and grid connection increases the income by around 28.6%. These findings suggest that merely grid connection will not suffice; it will be backed upon by the high quality of electricity supplied.

Authors review how the customer service performance measures in the electricity sector got formed and developed after privatization in 1989 [6]. Authors also analyses the effect of particular energy regulatory requirement which were called as information and incentives project (IIP) on the organizational management of an electricity distribution company. Though this study provides the good analysis of the service standards in the region of monopoly; this is only limited to one distribution company, i.e., of UK. It should also accommodate the global comparison of service standards.

Electricity consumers face different quality related problems from the utility sector [19]. The author has developed a new model of service quality enhancement to achieve maximum customer satisfaction in the India's south sector of electricity. This work solves the issue of using advanced and practiced methods for evaluating electricity customer satisfaction by utilizing structural equation modelling (SEM) to verify service quality satisfaction. SEM model verifies the direct relationship of electricity service with the dimensions of service quality which are tangibility, assurance, empathy, reliability, responsiveness, security and stability. This model could be tested globally.

In [22], author has developed a valid and reliable instrument to judge the customer perceived service quality in south Haryana. This work has been accomplished using multiple regression analysis and the results indicated the electricity supply quality to be the best indicator followed by reliability, pricing, responsiveness, convenience, assurance and empathy.

S. Achchuthan et al. [2] strive to find out the dimensions of service quality of electricity services provided by distribution company, i.e., Ceylon Electricity Board located in Badulla District of Sri Lanka. Structured questionnaires have been designed based on Parasuraman model and the secondary data have been collected using the random sampling technique. EFA detects five main dimensions of service quality which are tangibility, empathy, reliability, responsiveness and assurance. These measures account for about 62.9% of the total variability. But this study has taken cognizance of service quality of public sector only. Hence, the work can be progressed by the analysis of service quality in the private sector where the level of service quality is more enriched.

In [7], authors have examined the relationship between service quality, customer satisfaction and customer loyalty among the industrial customers served by public electricity distribution company in Malawi [6]. This relationship has been set up by utilizing the correlation and regression analysis. The Parasuraman SERVQUAL model has been used to seek the consumers' responses for the service quality. Authors have found that there is high dissatisfaction among industrial consumers of Malawi. This study has only examined the functional dimensions of service quality regardless of the relation of technical dimensions of service quality with customer satisfaction and loyalty.

Ken Costello has emphasized upon the matter that whether the utilities should compensate customers for the poor service quality, e.g. large service interruptions [8]. This is a question of concern involving both the customers and utility. As sometimes, it is not in control of the utilities to prevent the interruption due to some major faults. In the faults or interruptions, consumers are also somewhere responsible down the line. Resultantly, the question that should the utilities compensate the consumers and if yes, then how much price, should be answered only after thoroughly investigating the positive and negative outcomes of the compensation.

Sung-Yoon Huh et al. have analyzed the customers' preferences for good service quality and optimal electricity bill [12]. This work investigates whether the customers are ready to pay extra for improved electricity services. Authors have employed the choice experiments and a mixed logit model to quantitatively analyze the customers' preferences and their choice to pay more. This study suggests that customers analyze electricity bill and electricity mix as the two most important attributes when deciding about the level of service quality. Authors have found that customers can pay 2.2% more in the electricity bill for a significant increase in the share of renewable energy.

In [10], study revolves around the customers' perceptions towards cost-reflective electricity pricing in different regions of Australia. Steep rise in peak demand of residential consumers has demanded for new infrastructure

but that would cost more [9]. Hence, the suggested alternative is the ‘cost-reflective pricing’ to limit the rise in electricity prices. This pricing method is based upon Time-of-use and peak capacity pricing. The study shows that almost half of the participants in this survey were ready to

shift their peak load to the non-peak periods, but they didn’t support the peak capacity pricing. This study has focused only the preferences of urban consumers; it should have also been undertaken for rural and regional consumers.

Table 1. Comprehensive review of service quality in power sector

S. No.	Authors	Title of the paper	Journal/ Conference Name	Key Features
1	Chakravorty Ujjayant et al. [5]	Does the quality of electricity matter? Evidence from rural India [5]	Journal of Economic Behavior & Organization [5]	Improving access to electricity on rural household incomes [5]
2	Vinh Sum Chau [6]	Benchmarking service quality in UK electricity distribution networks [6]	Benchmarking: An International Journal [6]	Impact of information and incentives project (IIP) on the management of electricity distribution company. [6]
3	Suchismita Satapathy [19]	An analysis for service quality enhancement in electricity utility sector of India by SEM [19]	Benchmarking: An International Journal [19]	Designing the model of service quality enhancement and testing it in utility sector of South India. [19]
4	Hemant Sharma [22]	Modeling Customer Perceived Service Quality for Electricity Supply in South Haryana [22]	International Journal of Business and Management Science [22]	Develops an instrument for measuring customer perceived service quality using multiple regression analysis. [22]
5	S. Achchuthan et al. [2]	Service Quality Dimensions of Electricity Services: Evidence from Electricity Board in Sri Lanka [2]	Asian Social Science [2]	Exploratory factor analysis of different service quality parameters [2]
6	G. E. Chodzaza et al. [7]	Service quality, customer satisfaction and loyalty among industrial customers of a public electricity utility in Malawi [7]	International Journal of Energy Sector Management [7]	Correlation and regression analysis for assessing the relationship between service quality and satisfaction [7]
7	Ken Costello [8]	Should Utilities Compensate Customers for Service Interruptions? [8]	The Electricity Journal [8]	Positive and negative outcomes of the compensation provided by company to customers [8]
8	Sung-Yoon Huh et al. [12]	What do customers want from improved residential electricity services? Evidence from a choice experiment [12]	Energy Policy [12]	Qualitative analysis of customers’ willingness to pay for improved residential electricity services. [12]
9	Nina L. Hall et al. [10]	Cost-reflective electricity pricing: Consumer preferences and perceptions [10]	Energy Policy [10]	Customers’ preferences for Time-of-Use and Peak Capacity Pricing [10]
10	Ayodeji Olukoju [16]	Never Expect Power Always: Electricity Consumers’ Response to Monopoly, Corruption and Inefficient Services in Nigeria [16]	African Affairs [16]	Analysis of consumers’ problems towards supply of electricity [16]
11	Mark konya et al. [13]	Customer Perception and Reality: Unraveling the Energy Customer Equation [13]	SAS Global Forum, Washington DC [13]	Analysis of efforts for improving actual reliability performance [13]
12	Shu-Mei Tseng and Pin-Hong Wu [25]	The impact of customer knowledge and customer relationship management on service quality [25]	International Journal of Quality and Service Sciences [25]	Study of customer knowledge to improve service quality [25]
13	A. Parasuraman et al. [17]	Reassessment of Expectations as a Comparison Standard in Measuring Service Quality: implications for Further Research [17]	Journal of Marketing [17]	Examining the customer expectations for the analysis of service quality [17]
14	G. S. Sureshchandar et al. [24]	The relationship between service quality and customer satisfaction – a factor specific approach [24]	Journal of Services Marketing [24]	Investigation of link between service quality and customer satisfaction [24]
15	Herath Gunatilake et al. [9]	Valuing Electricity Service Attributes: A Choice Experiment Study in Madhya	Asian Development Bank [9]	Analysis of customers’ willingness to pay for better

		Pradesh, India [9]		electricity service in terms of hours and quality. [9]
16	Rajesh Bhatt and Anitha Sunil [3]	An empirical evaluation of alternative scales to measure service quality and assessment of service quality dimensions [3]	Journal of Management & Research [3]	Evaluation of SERVQUAL and SERVPERF in terms of reliability, validity and relationship with customer satisfaction [3]
17	Nitin Seth et al. [20]	Service quality models: a review [20]	International Journal of Quality & Reliability Management[20]	Linkage between 19 different service quality models [20]
18	Nurzat Abdyrasulova et al. [1]	Electric power supply - about the quality of the electric power and service quality of electric power consumers [1]	Int. Conf on Building of a dialogue on the Initiative of transparency in the fuel-energy complex, Kyrgyzstan [1]	Activity analysis of distribution companies for different factors of service quality. [1]
19	William Yu et al. [26]	Willingness-to-Pay for Quality of Service: An Application to Efficiency Analysis of the UK [26]	The Energy Journal [26]	Analysis of service quality along with technical efficiency analysis of company. [26]
20	Lawrence O. Hamer [11]	A confirmation perspective on perceived service quality [11]	Journal of Services Marketing [11]	Analysis of the relationship between customer perceptions and expectations [11]
21	Sarina Muhamad Noor and Noraini Nasirun [15]	Service Quality and Customer Satisfaction in a Natural Monopoly Company [15]	Colloquium on Administrative Science & Technology [15]	Analysis of relationship among the service quality variables with customer satisfaction [15]
22	D. Randall Brandt and Kevin L. Reffett [4]	Focusing on customer problems to improve service quality [4]	Journal of Services Marketing [4]	Impact of customer problems on customer satisfaction and dissatisfaction [4]
23	Arash Shahin [21]	SERVQUAL and Model of Service Quality Gaps: A Framework for Determining and Prioritizing Critical Factors in Delivering Quality Services [21]	URL: http://www.qmconf.com/Docs/oo77.Pdf [21]	Examining the ways to fill the different gaps in service quality models [21]
24	Vijay Modi [14]	Improving Electricity Services in Rural India [14]	Working paper of Centre on Globalization and Sustainable Development, The Earth Institute at Columbia University [14]	Status of electricity services to the rural areas of Madhya Pradesh and Uttar Pradesh and measures to improve the services [14]

Ayodeji Olukoju highlights the failure of National Electric Power Authority (NEPA) in providing efficient services to the consumers [16]. State monopolies have been the main reason behind this failure. Despite many attempts, for instance, reforms through deregulation, privatization and liberalization in Africa, situation of power sector could not improve. There is same scenario for domestic, commercial and industrial sectors.

The State Governments have taken many initiatives since 1999 to uproot the problem of inefficient services of power sector, but the target has not met. Consequently, corporate, domestic sector and industrial sector is facing huge economic and social losses. The author has analyzed the only solution as the deregulation of the energy sector and privatization of State monopolies.

Mark Konya et al. have emphasized upon the customer experiences that has resulted into the large gap between the customer perceptions and reality [13]. This gap has drastically affected the level of customer satisfaction. The two prominent factors of service quality affecting the customer satisfaction are power quality and reliability, as

cited by J. D. Power. This paper focusses on the need for utilities to address their issue behind poor service quality to lessen the gap between reliability perception and reality. It has been investigated that actual reliability should be improved or the customer reliability perception should be improved.

Tseng, S. M. et al. [25] investigate the impact and relationship amongst customer knowledge, Customer relationship management, and service quality. Also, the proposed study explores the impact of customer knowledge in improving service quality. As the demand of customer for service quality increases, then there may be chances of losing customers belief on the company, if the companies are not able to provide appropriate services to the customers. The study shows that the customer knowledge has a positive influence on service quality. The limitation of the proposed study is that there are many people that did not justify the requirements of questionnaire.

A. Parasuraman et al. [17] discuss the concept of specification and measurement of SQ. He addresses the impact of the interpretation of the expectations measure (E)

on the P-E specification. Interestingly, the relative importance of the five dimensions implied by this summary—that is, reliability being most important, tangibles being least important, and the other three being of intermediate importance—almost exactly mirrors our findings obtained through both direct (i.e., customer-expressed) and indirect (i.e., regression based) measures of importance. Authors conclude that in contradiction to as the SERVQUAL framework, increasing P-E scores may not necessarily reflect continuously increasing levels of perceived quality.

G. S. Sureshchander et al. [24] propose the relation between service quality and customer satisfaction. These two factors are closely related because there is proportional relationship between their increment and decrement. Providing high quality services to the customers leads to the customer satisfaction. This gives the more profit to the service provider companies, numerous loyal customers, and the customers retention. The study suggests that there are five key factors (content of the service, reliability, responsiveness, empathy, tangibility, systematic delivery of service and social responsibility of service quality) which are critical in terms of customer satisfaction.

H. Gunatilake, et al. [9] propose the choice experiment (CE) method to improve the electricity services and for this they examine the willingness to pay. The survey is done in 2,083 households in the state of Madhya Pradesh, India. Four service factors are considered for the study, namely hours of supply, quality, customer service, and accuracy and transparency in billing. In this study, the respondent provided with a choice between two scenarios that differ for the offered services in terms of attribute of service and monthly bill. For different schemes, they offered different monthly bills. The study claims that the quality, customer service, and accuracy of billing play major role when hours of supply is low.

Rajesh Bhatt et al. [3] give a comparative analysis of SERVQUAL and SERVPERF in terms of reliability, validity, predictive ability to explain overall service quality with customer satisfaction. By this analysis, SERVQUAL model is better for its diagnostic power. SERVPERF model explain overall service quality with customer satisfaction.

Nitin Seth et al. [20] have sequentially reviewed 19 different service quality models, their linkage and also highlighting their scope of further research. They have revealed that the service outcome and measurements are dependent on the factors like service setting, time, situation, need etc. They have explored following 19 models covering the growth from conventional services to web interacted services from 1984 to 2003. They have deeply traced all the models and observed the linkage between them. Further, the author categorized these models into three categories as follows: relation between various attributes of services, role of technology such as IT, measurement issues.

N. Abdyrasulova et al. [1] give a model or chart of service quality centers and are responsive for the service support of electric power consumers. The service quality centers developed a set of measures and proposals to solve the arising complaints (handled the complaints and clarification of the consumers' issues).

William Yu et al. [26] have incorporated the service quality and energy losses into the technical and allocative efficiency analysis of the electricity utilities. As generally, only technical and cost efficiency measures are relied upon for efficiency analysis of electricity distribution networks. This work measures the service quality of the distribution company in UK using the empirical approach of data envelopment analysis. The authors have found relatively low allocative efficiency of the distribution company that indicates towards the mismatch in distributing the resources among service quality improvement, expenditures and network energy losses. This work also includes the measurement of customers' willingness to pay extra for increasing and maintaining the particular levels of service quality.

Lawrence O. Hamer [11] has established the relation between consumer expectations and perceptions towards service quality theoretically and empirically. The results of this study consider the consumer expectations as the indicator of customer perceived quality. Some researchers consider the gap between customer expectations and perceptions as the indicator of service quality. This also suggests the same result that companies should strive to raise the customer expectations for increasing the customer perceived service quality. This work has suggested that service quality perceptions result from a process of confirmation instead of being a function of gap between customer expectations and perceptions.

Sarina Muhamad Noor and Noraini Nasirun have analysed the relationship of different variables of service quality and customer satisfaction in monopoly electricity distribution company of Malaysia [15]. Being a monopoly organization, it used to ignore the improvement in service quality as there is barrier for others to enter leading to lack of competition. Authors have found that there is strong predictive power in service quality variables for the customer satisfaction. Among different variables, assurance is found the most predictive followed by recoverability, reliability, empathy, responsiveness and tangibility. The authors have suggested for the utilities particularly the monopoly organizations to inculcate more efforts or training programmes for increasing the level of service quality.

D. Randall Brandt and Kevin L. Reffett have emphasized on the importance of giving attention to the issues of customers [4]. The utilities ought to analyze the different types of customer problems to keenly understand their impact on customer satisfaction and dissatisfaction. This analysis makes the improvement programmes easier for the public

utility service providers as it is critical for their efficiency ratings also. Customers get highly dissatisfied if there is any anomaly in the services provided which puts a very bad impact on satisfaction level. Consequently, utilities should best allocate their people and resources to understand the customer problems.

Vijay Modi [14] has examined the current scenario of service quality provided by the electricity utilities particularly to the rural areas of India. Specifically, two states of India, i.e., Madhya Pradesh and Uttar Pradesh have been considered in this study. The service quality of the distribution companies is lagging mainly due to crisis in terms of certain parameters like poor reliability of electricity supply, improper access to electricity for rural areas and lack of supply to meet peak demands. This work encompasses the study of various reform policies aimed at improving the service quality to the rural areas. Author has focused that the reliable service should necessarily be accompanied with the greater cost recovery objectives. The overall precis of Indian power sector along with the role of SEBs and previous rural electrification schemes have been detailed in this work.

Service sector has recognized the importance of delivering the best services to the consumers. Customer perceptions and expectations indicate the level of service quality (Singh, 2016). Despite the efforts of the management of the service industry, there are gaps in customer expectations and perceptions as illustrated qualitatively and quantitatively by different models like SERVQUAL. Authors have analysed the role of SERVQUAL model having five parameters of service quality as proposed by Parasuraman et al. [17], in studying the seven different gaps between customer expectations and perceptions. The findings suggest that working on the gaps of SERVQUAL model, the level of service quality can be significantly increased leading to better efficiency of the service industry.

III. SUGGESTIVE MEASURES

The review of service quality in the paradigm of electric utilities emphasizes the need of higher level of service quality which can help the electric utilities sustain in this world of competition on account of resultant increase in customer satisfaction. Today, every consumer can freely choose their electricity supplier and can easily shift from one utility to another or can reach to any open access market. Thus, customer satisfaction becomes more important to be taken care of. High level of customer satisfaction comes from good service quality in terms of all the attributes of a company's services like tangibility, empathy, assurance, reliability, responsiveness, credibility, communication etc.

Customers don't acknowledge the services of the utility in case of normal operations but in case of any fault or emergency conditions, customer satisfaction level gets highly affected from the service quality at that point of time.

Consequently, the utilities should always strive for improving the customer perceptions towards the utility services with the continuous increase in customer expectations. Efficiency analysis of the companies should necessarily consider the service quality along with other technical and cost analysis. The financial and human resources of the utility should be strategically allocated towards the objective of upgrading the service quality. Electricity utility should focus on enhancing the service quality in terms of frequency of interruptions, duration of interruptions, quality of power supply, fast redressal of consumer grievances etc.

IV. CONCLUSION

Service quality has become the need of the hour for the service utilities in this world of competition. Profit making has the roots in delivering the better services to the consumers. It will further increase the customer satisfaction and loyalty in lieu of the investment aimed at upgrading the service quality. This work briefs some important contributions in the field of analysis of service quality. Particularly, electricity service industry has been discussed upon in this paper. Various analysts have worked upon service quality models e.g., SERVQUAL first proposed by Parasuraman for the measurement of gap between customer expectations and their perceptions towards different parameters of service quality like reliability, responsiveness, Credibility, assurance, tangibility etc. Significant work has been done based on statistical analysis of the level of service quality to quantitatively judge the gap between customer expectations and perceptions and thereby to adopt the corrective actions for enhancing the service quality of the electricity utilities in the world.

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