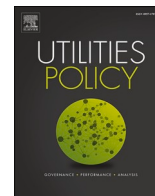Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Full-length article

Determining factors affecting customer satisfaction of the national electric power company (MERALCO) during the COVID-19 pandemic in the Phillippines

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ABSTRACT

This study aimed to determine factors affecting customer satisfaction of national electric power companies during the COVID-19 pandemic by integrating SERVQUAL and Expectation-Confirmation Theory approaches. A total of 529 participants voluntarily participated and answered an online questionnaire of 49 questions. Structural equation modeling indicated that Tangibility, Empathy, and Responsiveness were positively related to Service Quality which subsequently led to Customer Expectation, Energy Consumption, and Perceived Performance (PE). In addition, a higher PE was positively related to Confirmation, which eventually led to Customer Satisfaction. It was evident that integrating SERVQUAL and ECT could holistically measure customer satisfaction among electricity service providers.

1. Introduction

A national electric power company is a government-based company that mainly deals with the power system industry. This company ensures that the electrical supply is delivered to its customers successfully (Joskow et al., 1996). They are also responsible for the sales of electricity according to the price set by the Government under the law. It is also responsible for the maintenance of different electrical equipment such as the transformers and service entrances, the regulation of rules providing a proper installation of electrical supply in a particular establishment, and providing meter reading equipment wherein this is the basis of their electrical charges with their customers.

Internationally, electrical power utilities have been explored mainly in determining customer satisfaction. Mutua et al. (2012) investigated factors affecting customer satisfaction in the energy sector. It was concluded that the image of the service provider, perceived quality, perceived value, and customer expectation significantly affect customer satisfaction levels in Kenya. Resende and Cardoso (2019) assessed the quality of service in electrical distribution in Brazil. Their correlation analysis implied a weak association between service quality and overall customer satisfaction. Fiorio and Fiorio (2011) found that Europeans are satisfied with the prices they pay for their Utility Reform (Fiorio and Fiorio, 2011).

In the Philippines, Manila Electric Company (MERALCO) is one major electricity distributor, especially in National Capital Region (NCR), as presented in Fig. 1 (Metro Pacific Investments Corporation,

2019). It is an electrical distribution company serving almost 118 years, providing electricity to 25% of the country's cities and 75 municipalities. Its mission is to provide a world-class electric service highlighting the attributes that affect the company's growth and development, such as excellence in customer service, good performance, accountability, employees, investment, and integrity (MERALCO, 2018).

Prior to the COVID-19 pandemic, several complaints and dissatisfaction among consumers were evident with the MERALCO service. During the quarantine, the employees of MERALCO could not read the electric meter, resulting in overestimation, which caused 'bill shock' among consumers. MERALCO acknowledged its mistake and announced that the mode of payment for March 2020 to May 2020 was only estimated using their past three months of electricity bills. They considered providing an installment payment within this period since some of their customers lost their job due to the lockdown (MERALCO, 2020). With the consideration and empathy of this company towards its customers, the service quality of MERALCO has been challenged and underexplored. Since MERALCO is the largest electricity provider in the country, the need to assess and determine service quality and customer satisfaction should be deduced.

Service quality is one of the crucial aspects of every business wherein different companies compete in this area, which acts as a differentiator considering the same sector or business type (Afroj et al., 2021; Alam and Mondal, 2019). The SERVQUAL developed by Zeithaml et al. (1990) group provided five factors (reliability, assurance, tangibility, empathy, and responsiveness) that affect the service quality of a specific business. Previously, researchers used the SERVQUAL and Expectation-Confirmation Theory (ECT) in different applications. Moreover, recent studies explored the quality of service in electric distribution companies. Mirza et al. (2021) investigated the efficiency of electric distribution companies with the parameters used in service quality. The results showed that Pakistan's electric distribution companies do not operate optimally.

Despite available studies on satisfaction applying the SERVQUAL and the Expectation-Confirmation Theory (ECT), the results provided only apply to specific services. The two theories were used to describe the factors affecting the satisfaction of customers. Thus, the integration of the two theories was utilized for this study to cover the application described with the MERALCO customers holistically. In order to close the theoretical gaps, it is necessary to add some latent variables to the type of service that MERALCO provides to its customers. Integrating the

SERVQUAL and the Expectation-Confirmation Theory (ECT) forms a framework applicable to an electric distribution company such as MERALCO and can be extended to other utilities (e.g. water supply and distribution) as service providers.

This study aimed to determine factors affecting customer satisfaction with electrical power utility companies during the COVID-19 pandemic. Supported by the integration of SERVQUAL and ECT, this study explored and investigated deeply customer satisfaction focusing on customers of MERALCO during the new environment set by the COVID-19 pandemic. This study may contribute additional insight and shed some light on exploring customer satisfaction in electrical power distribution providers (Hsiao et al., 2018; Lee et al., 2019). Finally, the findings can be applied and extended, particularly for enhancing the electrical power utilities worldwide. The paper is organized as follows: (1) introduction, (2) theoretical research framework, (3) methodology, (4) results, (5) discussion and contribution, (6) conclusion and implication.

2. Related studies and theoretical research framework

2.1. SERVQUAL dimensions

SERVQUAL dimensions have been widely utilized to assess customer satisfaction. Five dimensions identified by Parasuraman et al. (1991, Fig. 2) set a benchmark for assessing service quality among service providers. SERVQUAL was utilized to evaluate public utility vehicle service quality in the Philippines (Chuenyindee et al., 2022). Similarly, German et al. (2022) analyzed factors affecting consumer preference for package carriers in the Philippines. However, it was stated that SERVQUAL dimensions alone should be backed-up with other theories
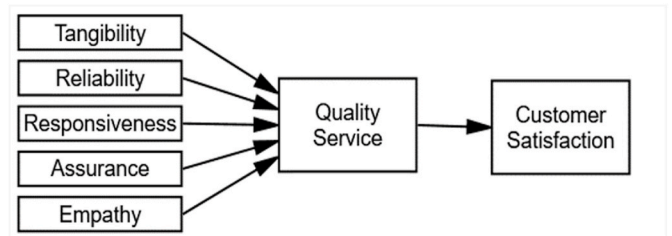
Fig. 2. Servqual dimensions.

Fig. 1. Geographic setting of the study.

and extended latent variables to analyze service quality and customer satisfaction thoroughly. Therefore, SERVQUAL is utilized for analyzing service quality among service-providing companies like other theories, such as the Expectation-Confirmation Theory (Jumaan et al., 2020; Chuenyindee et al., 2022).

2.2. Expectation-Confirmation Theory

Expectation-Confirmation Theory (ECT) can also describe the satisfaction of a consumer. According to Oliver (1977), this theory provides the idea that perceived performance relative to customer expectations may indicate whether the customer will be satisfied or not. Fig. 3 shows the theoretical framework of the ECT. It describes that satisfaction will be positively affected if the product or service perceived by the customer outperforms its expectations. In contrast, if the perceived performance underperformed with consumer satisfaction, a negative effect will indicate dissatisfaction. This theory was also applied by Jumaan et al. (2020), whose study utilized ECT and investigated mobile internet users, including factors affecting the user's intention to continue the usage of mobile devices.

2.3. Theoretical research framework

Fig. 4 represents the theoretical framework of this study that integrated the SERVQUAL and Expectation-Confirmation Theory. Since this study aimed to determine the energy consumption and the satisfaction of MERALCO's consumers during this pandemic, integrating both theories would holistically measure customer satisfaction (Jumaan et al., 2020; Thaicon et al., 2014).

Service Quality (SERVQUAL) has five elements: Reliability, Assurance, Tangibility, Empathy, and Responsiveness (Chuenyindee et al., 2022; Zeithaml et al., 1990). These elements are defined in terms of some core capabilities of service providers:

- Reliability – To provide service in a consistent and accurate performance.
- Assurance – To convey a feeling of trust toward its consumers.
- Tangibility – To maintain the quality of equipment, such as the electrical meter reading, wirings, and payment schemes that the service provider has.
- Empathy – to give consideration and attention to customer needs.
- Responsiveness – To respond and take action if the consumer contacts them.

Different studies have presented how reliability directly and positively affects service quality. Shahin and Pourhamidi (2011) presented the significant relationship between reliability affecting service quality and customer satisfaction among service providers. In addition, Lee et al. (2019) showed how reliability highlights service quality that indirectly reflects consumer behavioral intentions. Lastly, Zhao et al. (2015) discussed how the environment where the service provided affects the
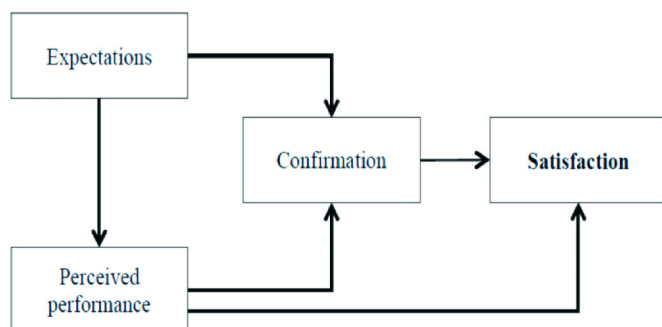

Fig. 3. Expectation-confirmation theory framework.

consumer's quality preference. Thus, it was hypothesized that:

H1. Reliability has a positive effect on Service Quality.

Assurance is highly needed, especially in retail and customer relations (Tumsekcali et al., 2021). Chuah and Hilmi (2011) and Sam et al. (2018) showed the significant effect of assurance on service quality and customer satisfaction. It is indicated that consumers want the promise of service delivered to be effective and efficient. Thus, it was hypothesized that:

H2. Assurance has a positive effect on Service Quality.

Tangible such as how the equipment (e.g., electric meters) would influence the perception of consumers when it comes to service quality (Chuenyindee et al., 2022). The appearance, machinery, equipment, and utilities that a service provider considers would affect the tangible latent variable (Alam and Mondal, 2019). Thus, it was hypothesized that:

H3. Tangibility has a positive effect on Service Quality.

Chuah and Hilmi (2011) expressed that service providers' relations and feelings for consumers influence service quality. When high empathy is implied, consumers would feel their importance as clients, leading to a highly significant effect on service quality and satisfaction (Chuenyindee et al., 2022). Tumsekcali et al. (2021) expounded on the latent empathy variable as one of the most crucial aspects of customer relationships during the COVID-19 pandemic. Thus, it was hypothesized that:

H4. Empathy has a positive effect on Service Quality.

Responsiveness as one of the SERVQUAL dimensions has been seen to affect service quality directly in terms of promptness, acknowledgment of service providers, and effective customer relation (Lee et al., 2019). The more responsive the service providers are, the higher the effect on service quality and the more satisfied customers are. Similarly, Chou et al. (2011) showed a highly positive direct effect of responsiveness on service quality and customer satisfaction. Thus, it was hypothesized that:

H5. Responsiveness positively affects Service Quality.

Additionally, Service Cost was added to this model (Fiorio and Fiorio, 2011), which is the price or the amount of electricity a particular consumer pays monthly. Based on Fiorio and Fiorio (2011), the price of service may affect consumer behavior. Thus, it was hypothesized that:

H6. Service Cost positively affects Customer Expectation.

H7. Service Cost positively affects Energy Consumption.

Moreover, it can be reflected that the service quality correlates to ECT as customers are expecting to receive and consume or use a service (Fu et al., 2018). Fu et al. (2018) emphasized that there is a relationship between the perceived service quality to the expectations of customers and its perceived value. Jumaan et al. (2020) explained that when the service providers provide (under-provide) services affects customers' prior experience. It could be deduced that a company's mission would be the basis of a consumer's expectation, and it would depend on the providers to confirm this, which would lead to a level of satisfaction among consumers (Afroj et al., 2021; Alam and Mondal, 2019). Thus, it was hypothesized that:

H8. Service Quality positively affects Customer Expectation.

H9. Service Quality positively affects Perceived Performance.

H10. Service Quality positively affects Energy Consumption.

Based on the ECT, an individual has an initial expectation of the product or service. Customers will then compare the initial expectation to the product or service experience. These differences between perceived initial expectation and actual performance can determine the customer's level of satisfaction (Rezaei et al., 2018). In line with the objectives of this study, the additional latent variable included customer expectation as part of the theoretical framework. Energy consumption as a latent variable was also included, defined as the amount of energy in
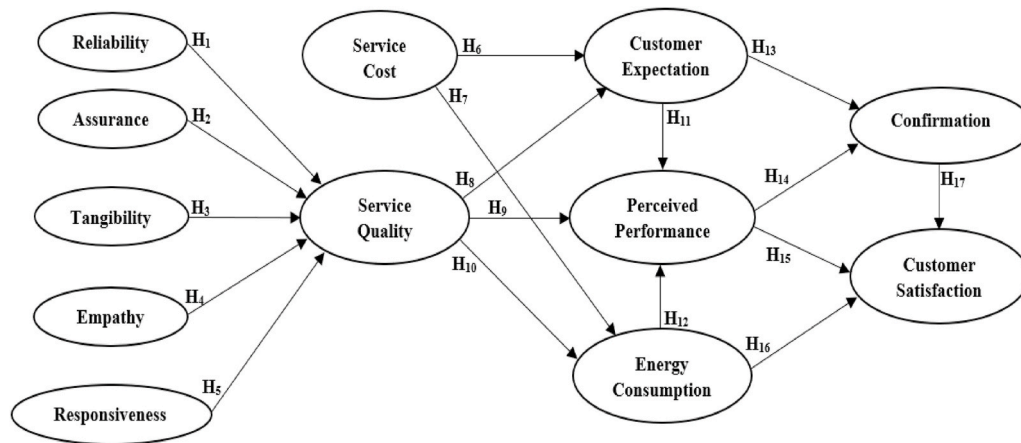
Fig. 4. Theoretical research framework.

kilowatt-hour (kWh) consumed in which MERALCO set this basis for their billing statements, hypothesizing that:

H11. Customer Expectation positively affects Perceived Performance.

H12. Energy Consumption positively affects Perceived Performance.

Under ECT, Confirmation is a latent variable related to perceived performance as part of actual service usage. The user or a particular consumer will have a separate confirmation of comparing the initial expectation to actual perceived performance (Oliver, 1977; Jumaan et al., 2020). This study was related to the actual usage of electricity that a consumer uses monthly. The consumer will have their expectation on how much they will pay on that particular month based on their actual usage of electrical supply. Having this confirmation and perceived performance as part of the latent variables, the theory states that it may be a good determinant in conceptualizing and assessing customer satisfaction. Thus, the researchers hypothesized the following:

H13. Customer Expectation positively affects Confirmation.

H14. Perceived Performance positively affects Confirmation.

H15. Perceived Performance positively affects Customer Satisfaction.

H16. Energy Consumption positively affects Customer Satisfaction.

H17. Confirmation positively affects Customer Satisfaction.

3. Methodology

3.1. Participants

There was a total of 529 participants gathered in this study. The researchers utilized the online form of a survey due to the COVID-19 pandemic. The approach is similar to the study of Abrahim et al. (2019). The questions were distributed using social media platforms such as Facebook, Twitter, Instagram, and Viber. Purposive sampling was considered to gather the 529 participants who paid and benefited from the service provided by MERALCO. The online survey question consisted of 49 questions using the 5-point Likert scale. Table 1 shows the demographic profile of the respondents.

3.2. Questionnaire

Following the theoretical framework provided in this study, we developed and adapted questionnaires administered online to determine the consumption and satisfaction of MERALCO customers during COVID-19. The questionnaires consisted of 13 sections: (1) The Demographic Profile Information (gender, age, occupation, monthly income, monthly electricity bill, years being with MERALCO), (2)

Table 1
Demographic profile of participants (*N=529*).

Characteristics	Description	N	%
Gender	Male	241	45.6
	Female	288	54.4
Age	20–29	236	44.6
	30–39	38	7.18
	40–49	137	26.0
	50–59	101	19.1
	60 and above	17	3.21
Occupation	Factory worker	70	13.2
	Sales	47	8.89
	Engineer	74	14.0
	Education Based	13	2.46
	Free Lancers	325	61.4
Monthly income (PHP)	Less than PHP 10,000	272	51.4
	PHP 10,000 – PHP 20,000	147	27.8
	PHP 20,000 – PHP 30,000	87	16.5
	PHP 30,000 – PHP 40,000	12	2.27
	PHP 40,000 – PHP 50,000	11	2.08
Monthly Electricity Consumption (PHP)	Below PHP 1000	104	19.7
	PHP 1000 – PHP 3000	327	61.8
	PHP 3000 – PHP 5000	72	13.6
	PHP 5000 – PHP 7000	19	3.59
	PHP 7000 – PHP 9000	7	1.32
MERALCO Service (Years)	Less than 1 year	44	8.32
	1–2 years	28	5.29
	2–3 years	10	1.89
	3–4 years	6	1.13
	4–5 years	12	2.27
	5 years and above	429	81.1

Reliability, (3) Assurance, (4) Tangibility, (5) Empathy, (6) Responsiveness, (7) Service Quality, (8) Service Cost, (9) Customer Expectation, (10) Energy Consumption, (11) Perceived Performance, (12) Confirmation, and (13) Satisfaction. This study utilized a 5-point Likert scale to evaluate the questionnaires for the latent constructs or variables included in the Structural Equation Modeling (SEM) seen in Table 2.

3.3. Structural equation modeling

AMOS 26 was utilized for Structural Equation Modeling (SEM). SEM is an advanced statistical approach wherein the causal relationships between latent constructs are simultaneously calculated (Hair et al., 2010; Li et al., 2020; Ouyang et al., 2018). Moreover, confirmatory factor analysis (CFA) was used to determine different items and relationships considered in the integrated framework. In addition, Irfan

Table 2
Questionnaire.

Construct	Item	Measures	Source
Reliability	RE1	The MERALCO gives a consistent power supply in our house during the pandemic.	Jun and Cai (2001)
	RE2	We receive our billing statement regularly during the pandemic.	Rezaei et al. (2018)
	RE3	They regularly respond to our concerns.	Han and Baek (2004)
	RE 4	On-time action in resolving electrical issues (long-time brownouts, damaged meters).	
Assurance	AS1	I trust MERALCO.	Zhou (2013)
	AS2	I think our electrical service is safe and free from illegal electrical connections.	Yang et al. (2004)
	AS3	The employees of MERALCO are polite with customers.	Wheaton et al. (1977)
	AS4	Since the pandemic, I feel the assurance of their service during this pandemic.	Zhou (2013)
	AS5	I think MERALCO is assuring us through good communication during this pandemic.	
Tangibility	TA1	Our electric meter reading equipment is updated.	Han and Baek (2004)
	TA2	We have good electrical wiring service (service cap, service drop, wiring arrangement, etc.).	Zhou (2013)
	TA3	The monthly billing paper is easy to read and understand.	Wheaton et al. (1977)
	TA4	Quick time of paying my bills (waiting line/process).	Han and Baek (2004)
Empathy	EM1	We feel that MERALCO cares about their customers.	
	EM2	During the pandemic, we see their consideration.	Han and Baek (2004)
	EM3	I think MERALCO has an interest in their customers' needs.	Zhou (2013)
	EM4	The installation payment during the pandemic has been well-communicated and executed.	Wheaton et al. (1977)
Responsiveness	RS1	We are informed every time they will cut the power supply.	Han and Baek (2004)
	RS2	The communication with their customer service is good.	Yang et al. (2004)
	RS3	They immediately respond if there is a damaged transformer, sudden short circuit, questionable brownouts, etc.	Zhou (2013)
	RS4	The feedback for our payment and other inquiries and concerns is good.	Zhou (2013)
Service Quality	SQ1	The quality service of MERALCO is good.	Kim and Oh (2011)
	SQ2	Payment methods (e.g., over-the-counter, online banking, debit/credit card, etc.) are working properly.	Rezaei et al. (2018)
	SQ3	I think MERALCO is giving a good service during the pandemic.	Jun and Cai (2001)
	SQ4	During the pandemic, we experienced no brownouts or electricity cut-outs.	Kim and Oh (2011)
Service Cost	SC1	Our MERALCO bill charges our residential at a reasonable price.	Han and Baek (2004)
	SC2	During the pandemic, the cost of our electricity supply was fair.	Zhou (2013)
	SC3	We feel that we are paying at a reasonable charge with our electric bill.	Kim and Oh (2011)
	SC 4	I am satisfied with the online payment mode due to the additional charges they implemented.	Mutua et al. (2012)

Table 2 (*continued*)

Construct	Item	Measures	Source
Customer Expectation	CE1	My expectation for MERALCO exceeds having a good quality of service.	Chiou (2004)
	CE2	I am satisfied if my expected bill to actual electric bill meets.	
	CE3	I am expecting a good response from customer service during this quarantine.	Wheaton et al. (1977)
	CE4	I am confident that my bill has no charges and that we are not being taken advantage of by increasing our bill during quarantine.	
Energy Consumption	EC1	I feel confident that my energy consumption will reflect on my bill.	Mutua et al. (2012)
	EC2	I am not worried that using a different appliance could cause a sudden increase in my bill.	Shokouhyar et al. (2020)
	EC3	I am confident with my electricity consumption during this quarantine.	Thaicon et al. (2014)
	EC4	The longer I use electrical appliances (electric fan, air conditioning unit, TV, computer, etc.), the more I feel satisfied.	Park (2019)
Perceived Performance	PE1	With MERALCO, they are very efficient and effective.	Fu et al. (2018)
	PE2	We are using the electric supply very well.	Park (2019)
	PE3	I am satisfied with their billing statement during this pandemic.	Chou et al. (2011)
	PE4	I can say that the no-disconnection policy during the pandemic is being followed.	Park (2019)
Confirmation	CO1	I believe that our billing statement during the pandemic is accurate.	Jumaan et al. (2020)
	CO2	I believe that MERALCO is doing their best to give us the service we need.	
	CO3	I think there is a need to change and/or improve the payment process and regulation of their price.	Chou et al. (2011)
	CO4	I think the Government should break the monopoly of MERALCO as the only electricity provider, especially in Metro Manila.	Mouton (2015)
Customer Satisfaction	CS1	Overall, I am satisfied with the service of MERALCO (electric supply, payment, customer service).	
	CS2	I am satisfied with the MERALCO during this pandemic.	
	CS3	I feel satisfied with the monthly bill I am receiving with MERALCO.	Chakraborty and Sengupta (2014)
	CS4	Overall, I can confidently say that MERALCO guarantees a transparent charge/fee in our bill during this pandemic.	Mouton (2015)

et al. (2020) utilized SEM to determine factors affecting willingness to pay for renewable energy. Their results indicated that SEM could highly determine the factor influencing human behavior.

4. Results

4.1. The initial model

Fig. 5 represents the initial results in determining the factors affecting customers' consumption and satisfaction during COVID-19.
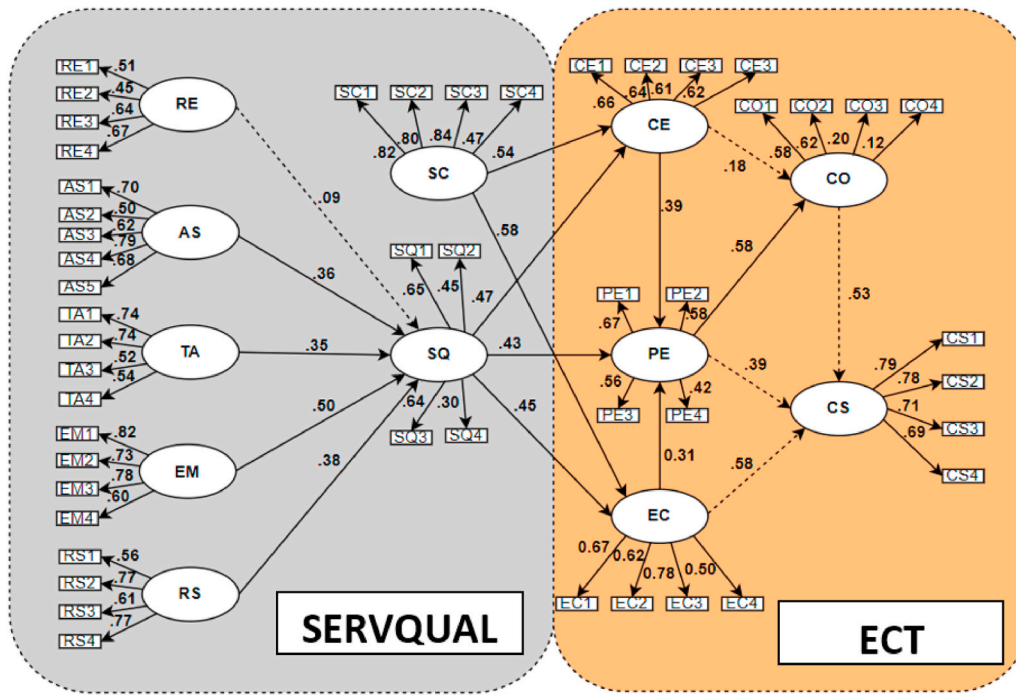
Fig. 5. Initial model result.

The initial model shows the path coefficients together with their indicators. Based on the figure, the reliability has a low path coefficient, making it insignificant. Some paths are considered insignificant, such as Reliability to Service Quality, Customer Expectation to Confirmation, Perceived Performance to Customer Satisfaction, Assurance, and Energy Consumption to Customer Satisfaction. Hence, following the suggestion of Hair et al. (2010), these non-significant latent constructs may be removed to enhance the model fit. Validity and reliability tests were run using Cronbach's Alpha, Composite Reliability, Standardized Covariances, and modification of indices (Hair et al., 2010).

4.2. The final model

The final model of this study is represented in Fig. 6. The model shows the path coefficients between its latent variables by integrating SERVQUAL and the Expectation-Confirmation Theory. From the model, tangibility, empathy, and responsiveness relate to SERVQUAL. Under ECT, Service Quality (SQ) and Service Cost (SC) are positively related to Customer Expectation and Perceived Performance (PE). Additionally, Customer Expectation (CE) and Energy Consumption (EC) were also positively related to Perceived Performance (PE), and Service Cost (SC)
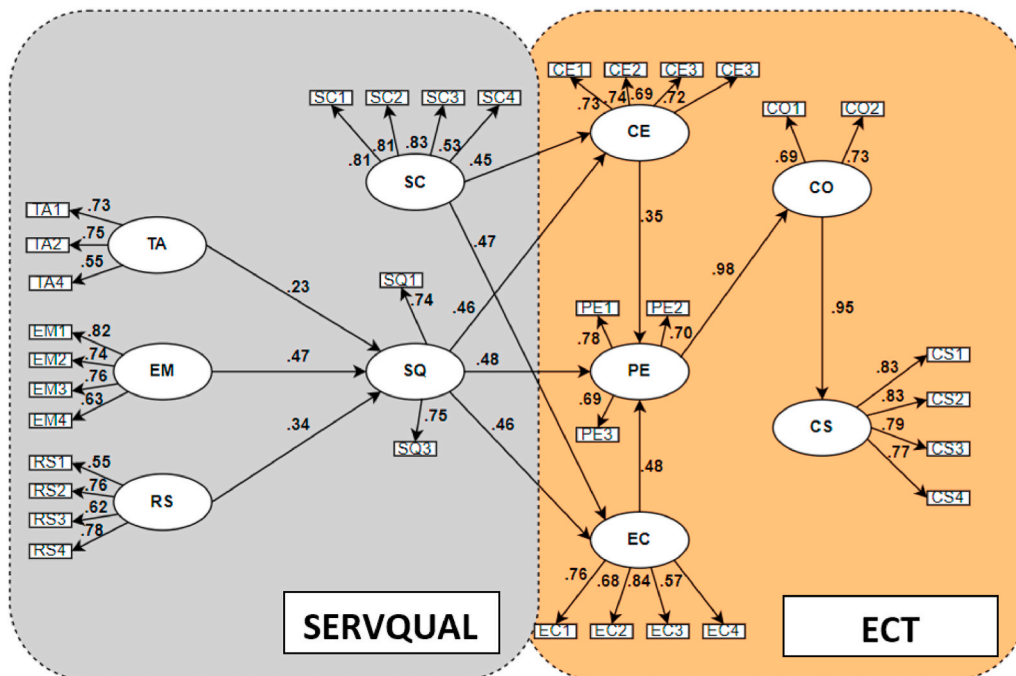

Fig. 6. Final model of the study: Integration of servqual and ECT

was positively related to Energy Consumption (EC). Moreover, Perceived Performance (PE) is positively related to Confirmation (CO), and Confirmation (CO) is positively related to Customer Satisfaction (CS).

4.3. Path analysis

Table 3 shows the summary of the path coefficients (β) between each latent variable, standard error (S.E.), Critical Ratio (C.R.), and the P-value. Based on the result, Tangibility (TA), Empathy (EM), and Responsiveness (RE) positively related to Service Quality (SQ) ($\beta = 0.23$, 0.47, 0.34 at p < 0.001). Moreover, Service Cost (SC) and Service Quality (SQ) were positively related to Customer Expectation ($\beta = 0.45$, 0.46 at p < 0.001). In addition, the Service Cost (SC) and Service Quality (SQ) were positively related to Energy Consumption (EC) ($\beta = 0.47$, 0.46 at p < 0.001). With Perceived Performance, the latent variables, which were the Service Quality (SQ), Energy Consumption (EC), and Customer Expectation, were seen to be positively related ($\beta = 0.48$, 0.48, 0.35 at p < 0.001). The Perceived Performance is positively related to confirmation ($\beta = 0.98$ at p < 0.001), which was the highest factor loading value in this model. Lastly, Confirmation is positively related to Customer Satisfaction ($\beta = 0.95$ at p < 0.001).

4.4. Statistical descriptive results

Table 4 shows the descriptive statistical results of the model. Each indicator for the latent variable was listed as the mean, standard deviation, and factor loadings. Additionally, Cronbach's alpha ($\propto$), Average Variance Extracted (AVE), and Composite Reliability (CR) were also given to observe the internal consistency, reliability, and validity of the measured constructs. Values greater than 0.6 are desirable for Cronbach's alpha and Composite Reliability (Hair et al., 2010). From the result, all measured constructs surpassed the suggested value. The table shows that TA and RE had AVE values less than 0.5, which is the suggested value for AVE. However, these measured items can still be considered since the value of their reliability is higher than 0.6 (Fornell and Larcker, 1981).

To test the validity of the constructs and the model, analyses such as the Fornell-Larcker Criterion (FLC) and Heterotrait-Monotrait (HTMT) Ratio were conducted as discriminant validity tests. Presented in Table 5 are the FLC results presenting how the diagonal values are more significant than the vertical and horizontal values. The number indicates a valid result for the constructs and model (Hair et al., 2010; Ong et al., 2021a, b).

4.5. Model of fit

Table 6 shows the model of fit of different indices with their recommended values (>0.80; Gefen et al., 2000; RMSEA< 0.70; Steiger, 2007). Based on the results, the data fit the model as the final model for

Table 3
Path analysis for final model.

Hypothesis	Estimate	S.E.	C.R.	P
TA → SQ	0.23	0.046	4.524	***
EM → SQ	0.47	0.054	7.144	***
RS → SQ	0.34	0.068	5.249	***
SC → CE	0.45	0.046	8.161	***
SC → EC	0.43	0.049	7.737	***
SQ → CE	0.46	0.064	8.067	***
SQ → PE	0.48	0.063	8.354	***
SQ → EC	0.46	0.068	8.072	***
CE → PE	0.35	0049	7.078	***
EC → PE	0.48	0.042	5.031	***
PE → CO	0.98	1.055	16.328	***
CO → CS	0.95	0.054	16.791	***

Note: *** Indicates that the p-value is less than 0.001.

Table 4
Composite reliability.

Factor	Item	M	SD	∝	AVE	CR	Factor Loading
Tangibility	TA1	3.83	0.82	0.706	0.467	0.721	0.735
	TA2	3.86	0.82				0.747
	TA4	3.87	0.80				0.550
Empathy	EM1	3.63	0.82	0.819	0.544	0.826	0.818
	EM2	3.83	0.85				0.736
	EM3	3.68	0.75				0.756
	EM4	3.65	0.88				0.628
Responsiveness	RS1	3.63	3.57	0.770	0.471	0.778	0.549
	RS2	3.83	3.57				0.762
	RS3	3.68	3.57				0.624
	RS4	3.65	3.65				0.784
Service Cost	SC1	3.61	0.89	0.815	0.567	0.836	0.809
	SC2	3.49	0.95				0.805
	SC3	3.56	0.92				0.827
	SC4	3.61	0.91				0.530
Service Quality	SQ1	3.91	0.71	0.719	0.554	0.610	0.737
	SQ2	3.84	0.73				0.751
Customer Expectation	CE1	3.64	0.83		0.518	0.811	0.732
	CE2	3.79	0.86				0.736
	CE3	3.94	0.78				0.691
	CE4	3.64	0.93				0.719
Energy Consumption	EC1	3.75	0.86	0.808	0.515	0.807	0.758
	EC2	3.53	0.96				0.676
	EC3	3.64	0.87				0.836
	EC4	3.56	0.92				0.574
Perceived Performance	PE1	3.71	0.77	0.732	0.526	0.768	0.779
	PE2	4.03	0.63				0.698
	PE3	3.57	0.89				0.695
Confirmation	CO1	3.57	0.93	0.754	0.616	0.635	0.691
	CO2	3.83	0.75				0.727
Customer Satisfaction	CS1	3.79	0.74	0.890	0.646	0.880	0.834
	CS2	3.72	0.82				0.827
	CS3	3.64	0.85				0.786
	CS4	3.56	0.89				0.766

Note: M denotes mean, SD denotes standard deviation, ∝ denotes Cronbach's Alpha, and AVE denotes Average Variance Extracted.

assessing the customers of MERALCO during the pandemic. With the following data results: GFI = 0.869, AGFI = 0.844, CFI = 0.926, IFI = 0.926, TLI = 0.917, CMIN/DF = 2.469 and RMSEA = 0.053 were deemed acceptable (Gumasing et al., 2022).

5. Discussion

This study investigated customer consumption and satisfaction with MERALCO during COVID-19 using the integrated theories, SERVQUAL dimensions, and the Expectation-Confirmation Theory (ECT).

5.1. Service quality (SERVQUAL)

From the result, Empathy had the highest path coefficient to service quality ($\beta = 0.39$; p = 0.001). Indicators revealed that caring, consideration, attention to inquiries, and informative guidelines with the payment were relevant factors in service quality. These findings can be compared to the study by Nadiri et al. (2008), wherein they found that empathy positively influences service quality with national airlines. From their discussion, customers on national flights were delighted to assist with their luggage, support, and interest in customer needs (Nadiri et al., 2008). These findings can also be reflected in the recent actions taken by MERALCO wherein they considered the 'No Disconnection Policy' until the end of January 2021 for households or consumers who are consuming below 200 kWh per month (CNN Staff, 2020). With the policy implemented by MERALCO, many people got a sense of relief for the time, thus, increasing customer satisfaction.

Additionally, responsiveness positively affected service quality ($\beta = 0.34$; p = 0.001). Service quality factors were indicators such as having an early announcement or giving information, good communication,

Table 5
Fornell-larcker criterion.

Latent	TA	EM	RS	SC	SQ	CE	EC	PE	CO	CS
TA	0.683									
EM	0.504	0.738								
RS	0.465	0.564	0.686							
SC	0.404	0.571	0.471	0.753						
SQ	0.574	0.562	0.537	0.513	0.744					
CE	0.432	0.548	0.515	0.603	0.511	0.720				
EC	0.464	0.547	0.482	0.578	0.535	0.59	0.718			
PE	0.559	0.654	0.599	0.659	0.66	0.667	0.662	0.725		
CO	0.366	0.504	0.435	0.543	0.469	0.557	0.507	0.630	0.785	
CS	0.507	0.670	0.585	0.640	0.572	0.663	0.612	0.709	0.576	0.804

Table 6
Model of fit measurement.

Goodness of Fit Measurement	Estimates	Cut-off	Reference
Goodness of Fit Index (GFI)	0.869	>0.80	Gefen et al. (2000)
Adjusted Goodness of Fit Index (AGFI)	0.844	>0.80	Gefen et al. (2000)
Comparative of Fit Index (CFI)	0.926	>0.80	Gefen et al. (2000)
Tucker Lewis Index (TLI)	0.917	>0.80	Gefen et al. (2000)
Incremental Fit Index (IFI)	0.926	>0.80	Gefen et al. (2000)
Minimum Discrepancy (CMIN/DF)	2.469	<5.00	Wheaton et al. (1977)
Root Mean Square Error of Approximation (RMSEA)	0.053	<0.07	Steiger (2007)

and immediate response to reports. Similarly, Ocampo et al. (2017) indicated that responsiveness is one of the service industry's most important factors or dimensions. Recently, the workforce and operation capacity of industries like MERALCO during this period are slowly increasing. Based on the results, it could be seen that consumers look forward to having good responsiveness towards the service providers during the COVID-19 pandemic (e.g., answering inquiries, reporting some electrical fault issues, and electric bill clarification).

Under SERVQUAL, the result shows that tangibility positively relates to service quality ($\beta = 0.228$; p = 0.001). Relevant factors include meter reading, electrical wiring service, and quick payment time. These findings were supported by Nadiri et al. (2008), who mentioned that tangibility was one of the factors that the service provider should observe and consider. Reflecting the current COVID-19 pandemic, Filipinos are now using online payment applications that they can easily transact with MERALCO. With this, technology can lessen the difficulty in transactions due to the service providers' limited operation.

5.2. Expectation-Confirmation Theory (ECT)

Service quality is positively related to customer expectation ($\beta = 0.46$; p = 0.001). The indicators revealed that overall good electricity service influenced the service quality positively. This result was supported by Lierop et al. (2018), who mentioned that perceived service quality positively affects customers' expectations of public transportation. With the continuance of paying for the service, it may be seen that customers would want to have better service and performance provided for them.

The perceived performance is positively related to confirmation ($\beta = 0.98$; p = 0.001). The announcement, such as having no disconnection policy followed, was a factor for Confirmation. According to Oliver (1977), customers tend to evaluate a given actual performance which gives a significant development with his confirmation judgment. With that, confirmation showed a positive effect related to customer satisfaction ($\beta = 0.95$; p = 0.001). An accurate billing statement, flexibility in payment schemes, and informing customers that the service provider is doing their best during this pandemic affected satisfaction. These findings are in line with Lierop et al. (2018), wherein they mentioned that when the user or consumer confirms based on the product experience, it will affect overall satisfaction due to its realizations.

In addition, the result shows that service quality is positively related to perceived performance ($\beta = 0.48$; p = 0.001). Having good overall service performance shows a significant impact on perceived performance. This result can be compared with the study of Jumaan et al. (2020), wherein they implied that having an actual service experience of the users on IT performance greatly affects the quality of service that the provider gives. Moreover, energy consumption positively affects perceived performance ($\beta:0.48 = p = 0.001$). It indicated that trust in the electricity provider and continuous electricity supply were important to perceived performance. Similarly, Fu et al. (2018) mentioned that the actual consumption of such customers was said to influence perceived performance. The service provider's overall performance may also be associated with customer needs.

Overall, it could be seen that the integration of SERVQUAL and ECT could measure customer satisfaction among electricity service providers. From the result, the highest factor was perceived performance to confirmation, leading to customer satisfaction. It is also seen that service quality and energy consumption relate to perceived performance. The key indicators for customer satisfaction include the availability of payment channels, the responsiveness of service providers, and reasonable billing.

6. Theoretical, practical, managerial implications and conclusion

6.1. Theoretical contributions

This study provided a framework that may describe and determine customer behaviors in energy consumption and satisfaction through the integrated theories, SERVQUAL Dimensions and the Expectation-Confirmation Theory (ECT). Other research focused on one theory or utilized the theories separately (Thaicon et al., 2014; Jumaan et al., 2020). However, this study provided additional insight as well as an original integration and application to measure customer satisfaction during the COVID-19 pandemic. Observing the comprehensive, integrated model can more deeply describe customers' behavior among different service providers, especially during the COVID-19 pandemic. The SERVQUAL-ECT framework could be deduced as a model that can holistically measure consumer service quality and satisfaction. It could be seen that the assessment of human behavior regarding utility service quality and satisfaction in a non-conventional scenario is positive, implying that the study contributes to knowledge and theories in assessing service value. The results of this study wanted to highlight that PE, CO, and CE are the primary reasons under ECT that significantly contribute to highly positive satisfaction.

6.2. Practical implications

Different practical implications were deduced in this study in line with the service quality and satisfaction of national electric power companies during the COVID-19 pandemic. It could be seen that Tangible, Responsiveness, and Empathy significantly contributed to positive service quality, leading to high customer satisfaction. Consumers projected satisfaction by highlighting the experience of care, communication, immediate response, electricity service, and quick time paying towards MERALCO. The insight reflects other utility service providers since the indicators portray a generalized action that other service providers could readily implement.

Subsequently, customer satisfaction was affected by the performance highlight, confirmation of expectation, consumption, and costs. In line with consumption and costs, it could be deduced that consumers were well aware of electricity usage, which resulted in billing costs. The reflection of being the largest electricity provider showed empathy by suspending the electricity disconnection during the COVID-19 pandemic. In this context, MERALCO was able to deliver, which confirmed consumer expectations and had a significant positive effect on their satisfaction.

6.3. Managerial & policy implications

The findings of this study suggested that the management should extend more empathy towards their customers as we are currently in the COVID-19 pandemic. In this situation, we suggest finding ways to have a program together with the movement and support of the Government to prolong and extend the due date of bills to customers. For instance, the Government will fund MERALCO since their customer may not be able to pay their bills on time/Additionally, people nowadays can use their mobile phones in different ways. It is suggested that the management should consider the application to be more comprehensible and has easy access so that people at any level of technology experience can easily utilize it. They may also consider increasing the number of customer service assistants to increase the response time. The Government may promote loans and support among people by creating programs and providing channels for individuals to utilize, especially the drawback on employment during the COVID-19 pandemic.

6.4. Limitations and future research

Along with the theoretical and practical contributions and observing its managerial implications, there are some limitations existing in this study. First, the location of this study took place solely in the Philippines. It could be suggested to measure satisfaction utilizing the integrated framework with other electricity service providers in other countries. Second, the study was conducted during the COVID-19 pandemic, which had a lot of new protocols due to the strict lockdown implementation. Conducting the study after the COVID-19 pandemic would be recommended to measure customer satisfaction and additional data analysis. Lastly, the study utilized SEM to measure satisfaction. The trend in machine learning algorithms would provide justification and verification in consumer behavior-related studies. Moreover, limitations of SEM may be uncovered with the utilization of higher computational power.

7. Conclusion

This study aimed to determine factors affecting customer satisfaction of national electric power companies during the COVID-19 pandemic by integrating SERVQUAL and Expectation-Confirmation Theory approaches. Structural equation modeling (SEM) indicated that Tangibility (TA), Empathy (EM), and Responsiveness (RE) were positively related to Service Quality (SQ) which subsequently led to Customer Expectation (CE), Energy Consumption (EC), and Perceived Performance (PE). In

addition, Service Cost (SC) was also found to significantly affect CE. Finally, higher PE was positively related to Confirmation (CO) which eventually led to Customer Satisfaction (CS).

Based on the result, it could be seen that the integration of SERVQUAL and ECT could holistically measure customer satisfaction among electricity service providers. Moreover, the highest factor was PE to CO, leading to CS. The key indicators for customer satisfaction were the availability of payment channels, the responsiveness of service providers, and reasonable billing. The exploration could be extended to other service industries for further validation.

The present research is one of the first in-depth studies that analyzed a national electric power company. Due to the lockdown, the community has limited access outside their respective houses, so utilizing technology is considered the most efficient method to transact and communicate with customers. This model may shed some light to see the current satisfaction level of the customers of MERALCO and other service-providing companies during this pandemic. With this model, the management of the service providers may get some insights into areas that may improve to enhance its service capability. Moreover, the battle against the COVID-19 pandemic is still ongoing, and it continuously affects the service quality of every business sector worldwide/

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

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