

Service Quality Assessment of Local Government Units' COVID Pandemic Response using Factor Analysis

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Abstract

The Philippines, one of the developing countries in Southeast Asia that reached the 1,000,000 cumulative mark of COVID-19 cases, are continuously challenged in controlling the pandemic through various government efforts and policies. As of April 2021, the country is in the 21st-30th bracket regarding the number of cases. The National Capital Region (NCR) or Metro Manila, the center of business, technology, and education of the Philippines, is tagged to be the most critical area in the country. Most of the offices and educational institutions adopted a remote setup. Malls, shops, and restaurants are hampered by the pandemic too. For more than a year of various community quarantine classifications and loose direction, Metro Manila residents imposed severe dissatisfaction with how the government is managing the pandemic. This research shall explore and assess the local government units (LGU) responses during the pandemic. Using factor analysis, the researchers evaluated the LGUs' pandemic response through the SERVQUAL Dimensions (Reliability, Responsiveness, Assurance, Empathy, and Tangibles). Results show that four factors were composed, which are 1) Efficiency and Effectiveness, 2) Available Resources, 3) Adequate Information and Convenience, and 4) Customized Service.

Keywords

Service Quality, COVID-19 Pandemic, Government Response, Factor Analysis

1. Introduction

As the world experiences a worsening crisis brought by SARS-Cov-2 or COVID-19, international organizations, various non-governmental entities, national and local government units gradually address varying medical, economic,

societal, and political concerns. In the Philippines, the outcry of the Filipinos to create effective and efficient solutions towards containing the virus has been louder. The local government units were requested to act faster and more responsive to address the increasing number of cases. The constituents questioned the effectiveness of various small and big actions in feeding programs, clean-up drives, and relief operations. The government did not consider that overall customer satisfaction was an integral part of executing service delivery.

By unfolding the service quality (SERVQUAL) attributes concerning the Filipinos' overall customer satisfaction will lead to valuable inputs in creating a better government response. Challenged by the increasing number of COVID-19 cases reported globally and locally, the National Government and its Local Government Units (LGUs) are having difficulty conducting an effective emergency response to its citizens. Metro Manila has an 11,855,975 population making it the most populated region in the country. Metro Manila is composed of 16 cities and one municipality. With a death rate of 13.0% in NCR, Pneumonia and Chronic Lower Respiratory infections are two of the leading causes of death in 2017 (Philippine Statistics Authority, 2019). COVID-19 is an inevitable high risk and a grave threat for the Metro Manila residents. LGUs have been initiating various emergency response programs and projects to manage the crisis. Since the risk of infection of COVID-19 affects older age and people with underlying conditions, the challenge for the government is on how they will provide effective and efficient service delivery of their emergency response actions considering the given risk of transmission leading to fatality.

1.1 Objectives

This research aims to assess the service quality of LGUs' pandemic response in Metro Manila by exploring the underlying factors. This study shall be beneficial in aligning projects and programs based on users' (constituents) perceived and expected service. Through this, LGUs' could redesign and realign their pandemic responses based on the study results.

2. Literature Review

The World Health Organization (WHO) office in China reported 29 pneumonia cases from an unknown origin in Wuhan City, Central China.

The cases were associated with a wet market where live poultry and wild animals were sold to locals. On January 12, 2020, the virus was identified as a novel beta-coronavirus. Today, the infection is now officially coined COVID-19 and the virus SARS-CoV-2 (Whitworth, 2020). Also, evidence shows that the virus is transmitted from one individual to another. Middle-East respiratory syndrome coronavirus (MERS-CoV) and the Severe Acute Respiratory Syndrome coronavirus (SARS-CoV) are transmitted human-to-human through droplets, personal contact, and contaminated object (World Health Organization, 2020).

This disease has been recognized in 77 countries, with over 3,000 deaths as of March 2020. As days passed by, researchers worldwide have been able to deeper understand its severity, transmissibility and populations affected. (Li Guo, 2020).

According to researchers in Europe, the global pandemic of SARS-COV-2 (COVID-19) is affecting health care delivery worldwide. Elderly and comorbid people have a higher chance of being affected by the virus. Previous studies show that kidney patients have a higher fatality rate during epidemics or catastrophic situations (Carlo Basile, 2020).

The World Health Organization (WHO) received a report from the Philippine Department of Health (DOH) that the first case of COVID-19 was a 38-year old female Chinese national. Seven new patients were added to the infected list from January to February 2020.

The Local Government Code of 1991 of the Republic of the Philippines provides genuine and meaningful autonomy to its local government units to attain its maximum development as self-reliant communities. Respective governors and vice Governors lead provinces. Mayor and Vice Mayor head cities and municipalities. The Governor and Mayor serve as the Chief Executive Officers of their assigned units, while the Vice Governor and Vice Mayor serve as the Chief Legislative Officer. The district elects council members. Two council members will be coming from the pool of elected barangay chairmen and barangay youth heads.

(Senate and House of Representatives of the Philippines, 1991) As per the Department of Interior and Local Government Regional Summary Report – December 31, 2019, 81 provinces, 146 cities, 1488 municipalities, and 42,045 barangays.

According to Borgave and Koranne, service quality is the comparison of customer expectations with service performance. Those organizations with high service quality lead to meeting the customers' needs, making the firms more competitive. The high service quality is attained by knowing the operation process through identifying the underlying problems in services and mapping out the measures for performance and outcomes precisely the level of customer satisfaction.

SERVQUAL is a multiple-item scale for measuring customer perception of service quality wherein five attributes of the SERVQUAL model, namely Tangibility, Reliability, Responsiveness, Assurance, and Empathy.

Tangibility means the physical facilities and the appearance of personnel. The reliability attribute refers to the company's ability to perform the promised service dependably and accurately. While, the responsiveness attribute relates to the willingness to help customers and provide prompt service. Assurance means the employee knowledge base which induces customer trust and confidence, and the empathy attribute is about caring and individualized attention provided to customers by the service provider (Parasuraman, 1988).

Research in Malaysia used the exact dimensions: assurance, reliability, tangibility, empathy, and responsiveness to identify service quality delivery and its impact on customer satisfaction (Jayaraman Munusamy, 2010).

As defined by Lovelock and Wright in 2002, service delivery refers to the actual delivery of goods and services to its customers. It involves the where, when, and how a service product is delivered to the customer, whether it is fair or unfair. According to Chen, Tsou, and Huang in 2009, the innovation of service delivery in the modern economy is critical to adapt to the changing preferences and emergence of multiple customers with various tastes, values, and patterns. Organizations used innovation to deliver their products effectively while providing more excellent value to their target clients and improving the existing service delivery methods to increase profit and decrease costs (Nico Martins, 2015).

Service Delivery is concerned with where, when, and how a service product works. Also, it tries to analyze whether the service delivered is fair or unfair. The service concept defines the "how" and the "what" of service design and helps mediate customer needs and an organization's strategic intent (Susan Meyer Goldsteina, 2002).

3. Research Design and Methodology

3.1 Methodology

The researchers started by defining the problem. It was supported by an extensive review of literature and interview. The research design was developed wherein this study adopted a mixed research approach, specifically explanatory sequential design (Clark, V. & Creswell, J., 2011). Quantitative data were collected first, and analysis was used after collecting the qualitative data (Johnson, 2017). The data used for this study came from the Philippine Statistics Authority, Philippine Department of Health, the World Health Organization, the Department of Interior, and the Local Government respective websites and available platforms of the NCR Local Government units. A survey questionnaire containing the SERVQUAL dimensions: Tangibles Reliability, Responsiveness, Assurance, and Empathy. The survey tool had its pilot test to 50 respondents to determine its validity. A sample size of 300 households was used and then stratified to represent all the LGUs. After collecting the data, these were cleaned and analyzed with appropriate statistical tools.

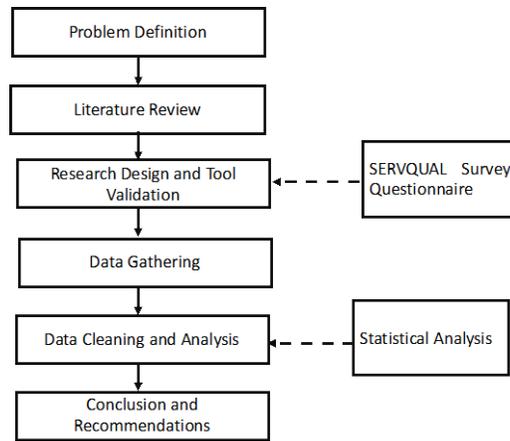


Figure 1. Research Flow

3.2 Research Instrument

The research instrument used was an online survey questionnaire with a 4-Likert scale. Table 1 shows the respective description and score used for assessing the 5 Service Quality attributes. On the other hand, Table 2 shows the scale used to evaluate overall Customer Satisfaction.

Table 1. Likert Scale for SERVQUAL Dimensions for Expected Service and Perceived Service

Score	Description
4	Very Satisfied
3	Satisfied
2	Less Satisfied
1	Dissatisfied

Table 2 shows the measurement items from the research instrument per SERVQUAL attributes. The researchers adopted the items from the indicators used by their research on measuring citizen satisfaction using the SERVQUAL approach (Prodromos Chatzoglou, 2014). The items were tailor-fitted with the present scenario of LGUs' emergency response towards the COVID-19 Pandemic.

Table 2. SERVQUAL attributes with corresponding measurement items

SERVQUAL Attributes	Code	Measurement Items
Tangibles	TAN1	LGU provides adequate physical facilities to accommodate COVID-19 Patients and safe and well-ventilated vaccination centers.
	TAN2	LGU front liners wear Personal Protective Equipment (PPE) during emergency response.
	TAN3	LGU uses up-to-date health and sanitary equipment.
Reliability	REL1	LGU shows strong commitment and dependability in pandemic responses.
	REL2	LGU executes crisis management response effectively.
	REL3	LGU provides emergency response services (city sanitation, relief operations, etc.) at the promised time.
Responsiveness	RES1	LGU responds promptly to their service.
	RES2	LGU provides accurate and timely information which are helpful.
	RES3	LGU provides adequate pandemic response services.
Assurance	ASS1	LGU front liners are trustworthy in providing responses.
	ASS2	LGU front liners are polite in communication.

	ASS3	LGU front liners have adequate support of their unit in performing pandemic response.
Empathy	EMP1	LGU attends to individual household needs.
	EMP2	LGU understands the needs of its constituents.
	EMP	LGUs provide convenience in performing pandemic responses.

3.3 Data Collection

Table 3 shows the number of samples per city/municipality for survey respondents/interviewees using stratified sampling.

Table 3. Number of Samples per Stratum

City / Municipality (Stratum)	No. of Households	Rel. Freq.	No. of Samples
City of Manila	1,763,348	13.79%	41
City of Mandaluyong	377,850	2.95%	9
City of Marikina	448,893	3.51%	11
City of Pasig	753,030	5.89%	18
Quezon City	2,919,657	22.83%	68
City of San Juan	121,197	0.95%	3
Caloocan City	1,581,025	12.36%	37
City of Malabon	364,283	2.85%	9
City of Navotas	249,176	1.95%	6
City of Valenzuela	619,324	4.84%	15
City of Las Piñas	587,675	4.60%	14
City of Makati	579,433	4.53%	14
City of Muntinlupa	481,762	3.77%	11
City of Parañaque	663,733	5.19%	16
Pasay City	412,497	3.23%	10
Pateros	63,643	0.50%	1
Taguig City	801,143	6.26%	19
NATIONAL CAPITAL REGION (NCR)	12,787,669	TOTAL	300

5. Results and Discussion

5.1 Demographics of the Respondents

Table 4 and Table 5 show the demographics of household respondents. Most of the respondents are below to 3-4 household members. While for socio-economic classes, most of the household respondents belong to Lower Middle with 9, Upper Middle with 65, and Upper middle but not Rich with 61.

Table 4. Number of Household Members

No. of Household members	
1-2	45
3-4	109
5-6	78
7 and above	68
	300

Table 5. Socio-Economic Classes

Socio- Economic Classes	
Poor: Below P10,957 monthly income	13
Low-income but not poor: P10,957 to P21,914 monthly income	32
Lower middle: P21,914 to P43,828 monthly income	94
Upper middle: P76,669 to P131,484 monthly income	65
Upper middle but not rich: P131,483 to P219,140 monthly income	61
Rich: P219,140 and above monthly income	35
	300

5.2 Factor Analysis

Using the Principal Component Analysis, the gaps from the Perceived and Expected service of the 15 statements of 5 SERVQUAL dimensions resulted in 4 components. As seen in Figure 2, the first four components have eigenvalues of at least 1. Based on the rule of thumb, these are the only components likely to represent the underlying factors.

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.322	42.146	42.146	6.322	42.146	42.146	5.949	39.663	39.663
2	1.852	12.346	54.493	1.852	12.346	54.493	2.078	13.854	53.517
3	1.346	8.971	63.464	1.346	8.971	63.464	1.477	9.846	63.362
4	1.044	6.957	70.421	1.044	6.957	70.421	1.059	7.058	70.421
5	.828	5.522	75.943						
6	.743	4.954	80.897						
7	.628	4.190	85.086						
8	.543	3.622	88.709						
9	.469	3.126	91.835						
10	.380	2.532	94.367						
11	.268	1.788	96.155						
12	.228	1.517	97.673						
13	.145	.964	98.637						
14	.125	.835	99.472						
15	.079	.528	100.000						

Extraction Method: Principal Component Analysis.

Figure 2. SPSS – Total Variance Explained

As presented in Figure 3 – Scree plot, component 1 is explicitly highly in terms of its eigenvalue compared to other components. Components 2 to 4 who possessed eigenvalues of at least one are still considered substantial factors.

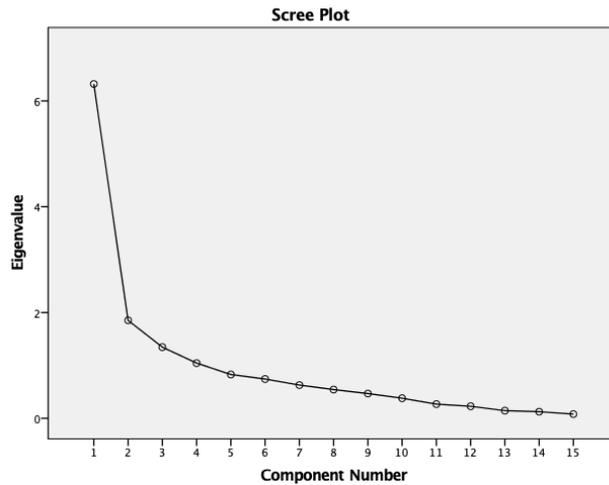


Figure 3. SPSS – Scree Plot

The r square values or communalities presented in Figure 4 show that all input variables have at least .40. It means that these are considered variables with high communalities. Thus, these contribute significantly in measuring all the four underlying factors.

Communalities

	Initial	Extraction
TAN1	1.000	.558
TAN2	1.000	.688
TAN3	1.000	.658
REL1	1.000	.823
REL2	1.000	.841
REL3	1.000	.514
RES1	1.000	.806
RES2	1.000	.516
RES3	1.000	.597
ASS1	1.000	.837
ASS2	1.000	.839
ASS3	1.000	.776
EMP1	1.000	.921
EMP2	1.000	.677
EMP3	1.000	.510

Extraction Method: Principal Component Analysis.

Figure 4. SPSS - Communalities

The Component Matrix in Figure 5 shows Pearson correlations between each input variable and the components. The results show that REL2, ASS2, ASS1, REL1, RES1, and ASS3 have one factor loading each. The rest of the variables that have more than one substantial loading are referred to be cross-loadings.

Component Matrix^a

	Component			
	1	2	3	4
REL2	.912			
ASS2	.899			
ASS1	.890			
REL1	.889			
RES1	.880			
ASS3	.866			
TAN3	.668	-.374		
REL3	.655			
EMP2		.699	.409	
TAN1		-.669		
TAN2	.465	-.633		
RES2	.369		-.590	
EMP3		.409	.568	
RES3	.530		-.533	
EMP1				.954

Extraction Method: Principal Component Analysis.

a. 4 components extracted.

Figure 5. SPSS – Component Matrix

The Rotated Component Matrix of Figure 6 shows ASS2, ASS1, RES1, REL2, ASS3, REL1, and REL3 measure the first component. REL 1 has higher factor loading in component one than in component two. The second component is measured by TAN2, TAN1, EMP2, and TAN 3. EMP2 has higher factor loading in component two than in component three, and TAN 3 has higher factor loading in component two than in component one. EMP3, RES2, and

RES3 measure the third component. RES2 and RES3 have higher factor loadings in component three than in component one. EMP1 measures the fourth component only.

Rotated Component Matrix^a

	Component			
	1	2	3	4
ASS2	.911			
ASS1	.908			
RES1	.890			
REL2	.887			
ASS3	.874			
REL1	.841	.341		
REL3	.670			
TAN2		.742		
TAN1		.728		
EMP2		-.587	-.565	
TAN3	.559	.578		
EMP3			-.651	
RES2	.351		.581	
RES3	.502		.563	
EMP1				.958

Extraction Method: Principal Component Analysis.
 Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 12 iterations.

Figure 6. SPSS – Rotated Component Matrix

6. Conclusion

The researchers clustered each variable item per factor based on the factor analysis, as shown in Table 6. Through the clustering of variables, factor 1 is aligned to the Efficiency and Effectiveness of the LGUs. Meanwhile, factor 2 is aligned to the Available Resources of the LGUs. Adequate Information and Convenience is aligned factor 3. Lastly, factor 4 is associated with LGUs’ Customized Service.

Table 6. Factor Components

1	2	3	4
ASS1: LGU front liners are trustworthy in providing responses.	TAN1: LGU provides adequate physical facilities to accommodate COVID-19 Patients and safe and well-ventilated vaccination centers.	EMP3: LGUs provide convenience in performing pandemic responses.	EMP1: LGU attends to individual household needs.
ASS2: LGU front liners are polite in communication.	TAN2: LGU front liners wear Personal Protective Equipment (PPE) during emergency response.	RES2: LGU provides accurate and timely information which are helpful.	
ASS3: LGU front liners have adequate support of their unit in performing pandemic response.	TAN3: LGU uses up-to-date health and sanitary equipment.	RES3: LGU provides adequate pandemic response services.	
RES1: LGU responds promptly to their service.	EMP2: LGU understands the needs of its constituents.		

REL1: LGU shows strong commitment and dependability in pandemic responses.			
REL2: LGU executes crisis management response effectively.			
REL3: LGU provides emergency response services (city sanitation, relief operations, etc.) at the promised time.			

Based on Table 7, it is explicitly shown that the Efficiency and Effectiveness factor has a higher mean gap among the other factors, which means that this has the most significant variance between perceived and expected service. On the other hand, the Customized Service factor has the lowest mean gap, which has the smallest variance between perceived and expected service.

Table 7. Mean Gap per Factor

Factors	Mean Gap
Efficiency and Effectiveness	-1.713888889
Available Resources	-1.183333333
Adequate Information and Convenience	-1.336666667
Customized Service	-0.853333333

The researchers recommend that local government units pay attention to all the factors as these result in negative gaps between what their constituents expect and receive from their pandemic responses. A great emphasis and attention should be made to address the mean gap of efficiency and effectiveness. Local units must revisit projects and programs. Also, they must provide adequate information and convenience, especially at these difficult times to their constituents. The availability of resources that is an existing challenge should match the needs of their members—the possibility of realigning their budget to cope with the dilemma of available resources. Lastly, the local units must continue to cater customized needs of their constituents, including but not limited to health-related, economic, and educational, as this is one of their measure of customer satisfaction.

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Joehanna K. Ngo is an ASEAN Engineer, Professional Industrial Engineer (PIE), founding member of the Philippine Institute of Industrial Engineers, Associate professor, practitioner and a former Quality Management Director of the University of Santo Tomas (UST). Her 30 years of active and intensive involvement in the UST include her being one of the prime movers in the successful implementation of Total Quality Management (TQM) in UST. Joehanna Ngo earned her Bachelor’s degree in Industrial Engineering at UST in March 1981. She received her Master’s degree in Industrial engineering from the University of the Philippines - Diliman and Ph.D. in Commerce at the University of Santo Tomas. She currently heads the Department of Industrial Engineering UST. She has presented in various local and international research colloquia and published journal conferences. Her research specializations include Productivity, Service Management, and Quality Engineering and Management.

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